



April 8, 2019

Pfizer Inc.
100 Route 206 North, MS LLA-401
Peapack, NJ 07977
Tel: 908-901-8630

Via e-mail and U.S. Postal Service

David N. Cuevas-Miranda, Ph.D.
Geologist/Marine Scientist
Senior RCRA Corrective Action Project Manager
US EPA-Region 2
Caribbean Environmental Protection Division
City View Plaza II, Suite 7000
Guaynabo, Puerto Rico 00968

**RE: Pfizer Pharmaceuticals, LLC, Carolina Puerto Rico Site - 65th Infantry Avenue, Km. 9.7
Revised Risk-Based Closure Criteria for Remedial Activities**

Dear Mr. Cuevas:

On behalf of Pfizer Pharmaceuticals, LLC (PPLLC), please find attached a revised Technical Memorandum prepared by Golder Associates Inc. that presents risk-based closure criteria (RBCC) for groundwater at the former Wyeth Carolina, Puerto Rico facility. The revised RBCC Technical Memorandum incorporates discussions held on March 7, 2019 with EPA and previous responses to EPA comments. Submittal of the revised Soil Gas Sampling Plan will be under separate cover.

We trust we incorporated Agency comment to your satisfaction, but please don't hesitate to contact me if you have any questions or need additional information.

Sincerely,

A handwritten signature in blue ink that reads "William G. Gierke".

William G. Gierke, P.G., Senior Manager
Pfizer Inc.

CC: Golder Associates Inc. – Cover Letter only.



TECHNICAL MEMORANDUM

DATE April 8, 2019

Project No. 103-82746.B

TO William Gierke
Pfizer Inc.

CC Jeff Paul, Matthew Crews

FROM Gregory Garvey

EMAIL ggarvey@golder.com

**RE: DEVELOPMENT OF SITE-SPECIFIC GROUNDWATER RISK-BASED CLOSURE CRITERIA –
FORMER WYETH FACILITY IN CAROLINA, PUERTO RICO**

Golder Associates Inc. (Golder) has prepared this Technical Memorandum, on behalf of Pfizer, Inc. (Pfizer), to summarize the groundwater risk-based closure criteria (RBCC) for the former Wyeth facility in Carolina, Puerto Rico (site). The criteria presented in this memorandum are based on potential on-site exposures to constituents of concern under current and future conditions via the potential vapor intrusion pathway. This memorandum summarizes the approach and procedures for calculating the criteria and presents the criteria for risk-based closure for the site in general accordance with United States Environmental Protection Agency (USEPA) guidance on inhalation risk assessment and vapor intrusion (USEPA 2009; 2015; 2017).

1.0 INTRODUCTION

Analytical results from assessment activities conducted from September 2010 through December 2013, reported that chlorinated volatile organic compounds (CVOCs) were detected in soil and groundwater at the site. A Remedial Action Plan (RAP) was submitted to the USEPA in July 2014. Phased implementation of the RAP commenced in July 2014 with full-scale implementation beginning in the fall of 2015. The selected remedial option included injection of amendment to accelerate biodegradation of the CVOCs with subsequent groundwater monitoring.

Prior to implementing any remedial activities, Golder completed a screening level human health risk assessment in 2012. Site conditions have since changed, as constituent concentrations in soil and groundwater are significantly reduced and multiple buildings have been demolished. Therefore, the conclusions of the initial screening level human health risk assessment may no longer be applicable to the site. As such, Pfizer has requested that Golder evaluate current conditions at the site to establish RBCC for groundwater that would be protective of human health in concert with site institutional controls (i.e., site restricted to industrial/commercial use with groundwater use restrictions).

Golder used a multi-step approach to establish the RBCC for the site. This process included evaluating current analytical data, selecting constituents of potential concern (COPCs), and analysis with predictive modeling. The following details the specifics of this process and establishes RBCC for the site.

2.0 SITE BACKGROUND

The site is located at Kilometer 9.7 of 65th Infantry Avenue, Carolina, Puerto Rico and is situated on the northeastern portion of the island, roughly 10 kilometers southeast of the San Juan airport and eight kilometers south of the Atlantic Ocean. The coordinates for the site are approximately 18 degrees, 22 minutes, 55 seconds north latitude and 65 degrees, 57 minutes, 59 seconds west longitude. The site location and its general topographic features are shown on Figure 1. In the mid-to-late 1950s, the original plant was built for Park Davis & Company for Pharmaceutical manufacturing.

The facility was purchased by Lederle Laboratories (division of American Cyanamid Company) in 1974 and operated to 1994 - when American Home Products took over until 2002 and the facility operated under Wyeth Ayerst Lederle (Wyeth) until 2009, when Pfizer acquired Wyeth. Under Pfizer's ownership, the facility manufactured an injectable, antibiotic pharmaceutical product. In 2013, pharmaceutical plant operations ceased, and demolition began.

2.1 Current and Future Site Conditions

The site consists of 20.33 acres of land located in a mixed-use commercial and industrial area. The site is bounded on the north by 65th Infantry Avenue followed by various commercial businesses; on the west by an unnamed road followed by a vacant lot; on the south by State Road PR-887 followed by warehouses, a supermarket, and a government building; and on the east by various restaurants and a furniture store.

Prior to demolition in 2013, the site contained 11 primary building structures (Buildings A, B, C, D, E, F, G, H, I, J, and M) that were used for various purposes, including office space, manufacturing, packaging, engineering and maintenance, utilities (chillers, boilers, and emergency generators), laboratory space, storage, and support areas. Currently, two of the eleven building structures remain (Buildings A and B) in addition to the guard (security) Building F. These remaining buildings are unoccupied, and no workers are present at the site full-time. The site is currently for sale.

Prior to site demolition activities, building structure footprints occupied approximately 545,374 square feet (approximately 65% of the site). The three buildings (Buildings A, B, and F) that remain onsite occupy an approximate footprint of 30,000 square feet. Building foundations that were removed in 2013 have been regraded and seeded. The remainder of the site is in pre-demolition condition and is occupied by asphalt or concrete paved surfaces and landscaped areas. The former pond was regraded and is now a storm water drainage. The current site plan is presented on Figure 2A and the historic site plan showing all historic buildings, including those demolished, is presented in Figure 2B.

Future use of the property will be restricted to industrial/commercial use along with groundwater use restrictions in the form of a restrictive covenant (Deed Restriction) to memorialize the institutional controls for the property pending any sale agreement. The institutional controls will limit reuse of the property for industrial and commercial use only and prohibit any residential redevelopment of the property. In addition, the Deed Restriction would serve to notify a future buyer of historic site activities (e.g. presence of historic soil and groundwater impacts) and Remediation Area, with restrictions on groundwater use (given the site and area is served by municipal water). A draft of the restrictive covenant is provided in Attachment A.

2.2 Site Investigations

In 2010, Pfizer retained Golder to conduct an Environmental Site Assessment for evaluating the potential for environmental impacts as a result of past and current activities on the property. The discoveries detailed in the Environmental Site Assessment led to a preliminary subsurface investigation in September 2010. Samples collected from soil borings/temporary well points indicated that CVOCs were present in groundwater at the site at concentrations above maximum contaminant levels. From September 2010 through December 2013, Golder conducted site assessment activities to further delineate the groundwater impacts and investigate soil conditions for potential sources(s), including additional soil and groundwater grab sampling from soil borings/temporary well points and soil gas sampling. A total of 15 shallow monitoring wells (MW-01S through MW-15S) and three deeper monitoring wells (MW-02D, MW-03D, and MW-07D) were installed across the site and sampled from 2010 through 2013. Sampling results from these investigations indicated that chlorinated hydrocarbons were present in the vicinity of the former locations of Building D and Building E, and, to a lesser extent, west of the former location of Building G (Figure 2B). These results indicated there is an additional potential contribution to the onsite chlorinated solvent contamination from an offsite source located upgradient (south) of the site.

Based on soil samples and drill cuttings that were logged during the advancement of more than 60 soil borings and 30 monitoring well installations, the lithology underlying the site is heterogeneous. A layer of fine sand with varying amounts of silt intermixed with discontinuous clay seams was observed to a depth of approximately 20 to 30 feet below ground surface (bgs) on the eastern portion of the site and to a depth of approximately 40 feet bgs on the western portion of the site. Boulders and weathered volcanic rock fragments were encountered in some of the borings at varying depths between 5 to 20 feet bgs. The sandy layer observed in the eastern portion of the site was very dense and compact.

From September 2010 to December 2013, 61 soil borings were advanced to depths ranging from 5 feet bgs to 60 feet bgs at the site. In general, soil from each boring was screened in the field for soil headspace volatile organic compounds (VOCs), at 1-foot or 2-foot intervals, with an organic vapor analyzer equipped with a photo-ionization detector. Soil samples were collected from points representing the highest soil headspace screening results and/or indications of impacts (visual and olfactory) from select boring locations and submitted for laboratory analysis of chlorinated VOCs. The analytical results from the soil samples collected from September 2010 to December 2013 indicated that VOCs were detected at the site at concentrations above laboratory method detection limits; however, the concentrations were not above the USEPA November 2013 regional screening levels (RSLs) for industrial soil (Attachment B). As a result, a significant residual source within the vadose zone at the site does not appear to exist, based on the extensive distribution of soil test borings in the area with groundwater impacts – indicative of an old weathered source. Soil boring locations are presented on Figure 3. Soil analytical results are presented in Attachment B and concentrations for trichloroethene, tetrachloroethene, and vinyl chloride in soil are depicted in Figure 4.

As described in the 2014 RAP, the source of contamination is unknown, but some areas are suspected to be from the use of trichloroethylene (TCE) as a refrigerant in former operations (prior to Pfizer's use of the property). As a result of the findings included in the RAP, the 'Known Conditions Remedial Action Area' was outlined at the site (Figure 5). This has been identified as the area within the property that has detected impacts in soil and groundwater for remediation. Other investigations at the property have not shown similar impacts and are therefore, considered outside of this area. While the Known Conditions Remedial Action Area was identified for the purposes of target site remediation (i.e., amendment injections to reduce VOC concentrations), the areas outside of this area were still included in the screening of COPCs and RBCC were developed for these areas. Based on the calculated RBCC,

these areas do not have VOCs above the RBCC and are therefore not considered areas of concern for site redevelopment.

2.3 Conceptual Site Model

Based on the site history and the remedial investigations for the site, the conceptual site model is an unknown source of CVOC (primarily TCE) contamination at depth. The impact area is limited to a portion of the site (Figure 5) and includes impacts to groundwater and soils at depth within the saturated zone. Shallower soils in the unsaturated zone have VOC concentrations below detection limits in most sampling locations with a few detected concentrations below levels of concern for direct contact (i.e., below current RSLs). Currently, there is no on-site exposure to the impacted soil and groundwater within the Known Conditions Remediation Action Area. The groundwater is not used for any purpose (e.g. no supply wells for tap water or irrigation water as the previous Franchise well was decommissioned) and impacted soils within the saturated zone are at depths of 20 feet bgs and greater. Previous well surveys (inventories) identify there are no nearby (< 1/2 mile) groundwater receptors (i.e., potable groundwater wells) as identified in the screening level risk assessment (Alpha 2012; Golder 2012). Soils at such depths are generally inaccessible to typical excavation scenarios which are generally limited to 15 feet bgs (MADEP, 1995; PADEP, 2018). In addition, the Deed Restriction will identify the location of soil impacts in the event that future excavations may breach the saturated zone. Therefore, the only potentially complete exposure pathways to VOCs in groundwater and soil is vapor transport into air.

3.0 DATA EVALUATION

Golder reviewed the groundwater analytical results from 29 shallow monitoring wells and 36 injection wells at the site. The shallow monitoring wells and injection wells are listed in Attachment B and presented on Figure 6.

For soil, Golder reviewed the soil analytical results from 32 soil borings. The soil borings are listed in Attachment B and locations provided in Figure 3. This review was to determine the usability of the data in selecting COPCs and evaluating/quantifying risk.

3.1 Data Summary

The constituents included in this evaluation were selected based on soil and groundwater impacts at the site. For groundwater, the following constituents were screened: ethane, ethene, methane, 1,1-dichloroethene, cis-1,2-dichloroethene, total 1,2-dichloroethene, tetrachloroethene (PCE), TCE, and vinyl chloride. For soil, the following constituents were screened: chloroform, PCE, TCE, cis-1,2-dichloroethene, trans-1,2-dichloroethene, and vinyl chloride. For each constituent, the relevant statistical information (frequency of detection, range of reported concentrations, and range of detection limits) was compiled for review and is presented in Tables 1 and 2 for groundwater and soil, respectively. Specific assumptions used in the data analysis are as follows:

- For groundwater, only analytical results of samples collected from shallow monitoring wells were included, i.e., when a location has two paired wells (e.g., shallow well MW-02S and deep well MW-02D), only the shallow well data are considered to evaluate the soil-vapor pathway.
- Only data deemed usable based on the data validation process were included.

3.2 Selection of Constituents of Potential Concern for Human Health Risk Assessment

3.2.1 Groundwater

The USEPA vapor intrusion screening levels (VISLs) (USEPA, 2018a) for commercial/industrial workers were used as the primary source for human health risk-based screening levels, based on a target cancer risk of 1×10^{-6} , a target hazard quotient (HQ) of 0.1, and a default groundwater to indoor air attenuation factor of 0.001. Other parameters, such as groundwater temperature and toxicity values were not changed from the default assumptions in the model. Constituents whose maximum concentration in groundwater was reported above either of their carcinogenic or non-carcinogenic VISL were considered a COPC for which a constituent-specific RBCC would be derived.

The results of this comparison identified three constituents (PCE, TCE, and vinyl chloride) as COPCs in groundwater (Table 1). One constituent, 1,1-dichloroethene, was not identified as a COPC based on a maximum detection concentration below its VISL. For the remaining constituents (cis-1,2-dichloroethene, total 1,2-dichloroethene, ethane, ethene, and methane) numerical VISLs were not available due to a lack of inhalation toxicity factors. Therefore, they were not retained as COPCs and were evaluated qualitatively in the uncertainty analysis (Section 6.0).

3.2.2 Soil

Recent USEPA guidance documents on evaluating the vapor intrusion pathway (USEPA, 2015; 2018c) do not include an approach for evaluating soil concentrations of VOCs for vapor intrusion exposures. USEPA does not provide VISLs for soil due to the high degree of uncertainty with the partitioning of VOCs from soil to soil vapor (USEPA, 2015). In addition, the majority of CVOCs detected in soils at the site are at a significant depth (>20 feet bgs) and within the saturated zone. As such, the impacted soils are within the depth and location of the current injection areas and any VOCs concentrations in soils are likely to decrease as remedial activities continue at the site.

The analytical results from the soil samples indicated that CVOCs were detected at the site at concentrations above laboratory method detection limits; however, the concentrations were not above the USEPA November 2013 RSLs for industrial soil (Golder, 2014). A comparison of this data to the most recent RSLs from November 2018, identify TCE as detected at a maximum concentration of 6.3 milligrams per kilogram (mg/kg) which is above the RSL of 1.9 mg/kg (the RSL * 0.1 for noncancer risks). Figure 4 includes a screening of the data for PCE, TCE and vinyl chloride against the RSLs for direct contact (ingestion and inhalation). The results of the revised screening show one single exceedance at 22-24 ft bgs at TB-52. However, the comparison of soil data to any RSLs is not applicable to the conceptual site model where vapor transport is the primary source of exposure. The industrial RSL for TCE is based on ingestion and inhalation of dusts and volatiles in ambient air and does not account for any vapor intrusion pathway of exposure. In addition, this single concentration above the RSL is at 22 to 24 feet bgs, which is lower than any reasonable anticipated direct contact (e.g., from excavation or other site activities).

As there are no soil screening standards for vapor intrusion and Pfizer recognizes the need for soil vapor evaluation in the known contamination area, soil gas sampling will be conducted in this area at the conclusion of the remedial activities (amendment injections) to gauge the potential for vapor intrusion from soil impacts at the property. As described in the recently submitted draft Soil Gas Survey Work Plan (dated February 7, 2019), soil gas sampling at three proposed locations, SG-15, SG-16 and SG-17, are within the vicinity of TB-52 and will be used to evaluate the TCE in soil vapor to evaluate whether TCE in soil and groundwater in this area would indicate a potentially

complete pathway for VI in the future if buildings are constructed in the Remediation Area. As stated previously, the Deed Restriction for the property will highlight site impacts and the potential consideration of vapor barriers in the construction of any future buildings on site.

4.0 CALCULATION AND SELECTION OF RISK-BASED GROUNDWATER CLOSURE CRITERIA

For the groundwater RBCC, Golder input site-specific parameters into USEPA's Johnson & Ettinger (J&E) model for vapor intrusion (USEPA, 2017) to reflect conditions at the site (i.e., depth to groundwater; soil type) and used USEPA's default values for groundwater temperature and soil properties based on the soil type within each monitoring well group.

For soil type, Golder reviewed the previous investigations that identified the lithology from the ground surface through the shallow saturated zone as primarily comprised of saprolite material. As saprolite is not listed as a soil type in the J&E model, soil samples were collected in January 2018 from shallow and deeper depth intervals at three locations; JE-1, JE-2, and JE-3 (Figure 6). These samples were analyzed for soil classification, grain size and Atterberg limits. Attachment D provides a copy of the geotechnical test results. The results of this testing indicated the following soil types at each location:

- JE-1 – at 4-5 feet bgs the soil type identified is silty gravel and at 8-9 feet bgs, the soil type is silt.
- JE-2 – at 4-5 feet bgs the soil type identified is clay and at 8-9 feet the soil type is clayey sand.
- JE-3 – at 4-5 feet bgs, the soil type is silt and at 9-10 feet the soil type is clay.

For each depth interval, the corresponding soil type was entered into the J&E model. For JE-1 soils, where 'silty gravel' was indicated in the soil classification, 'silt' was used as silty gravel is not a soil type in the model. The default groundwater temperature of 25 degrees Celsius (°C) (USEPA, 2018a) was used in the model, which is similar/close to what was observed at the site (27°C). Aside from selecting a commercial option with no basement, no other inputs were changed from the default parameters (e.g., bulk density, soil porosity). The J&E model worksheet outputs for groundwater to indoor air attenuation are presented in Attachment E. The groundwater to indoor air attenuation factors for the COPCs, calculated by the J&E model, are summarized in Table 3.

The 30 shallow monitoring wells were separated based on geographic distribution in order to evaluate potential RBCCs based on specific areas of the site, rather than on a single well location. This allowed for a more area-specific evaluation of potential future building conditions. The depth to groundwater for each well grouping for monitoring wells (Attachments C-1 and C-2) was based on the average value of the shallowest groundwater well within that group. The well location or area groupings (with soil type) are as follows:

- Group 1 (silt) – MW-04S, MW-05S, MW-06S, and MW-09S;
- Group 2 (silt and clay) – MW-02S, MW-07S, MW-11S, MW-15S, MW-21S, MW-22S, MW-28S and MW-31S;
- Group 3 (clay and sandy clay) – MW-16S, MW-23S, and MW-24S;
- Group 4 (silt) – MW-13S, MW-17S, MW-18S, MW-19S, and MW-20S;
- Group 5 (silt) – MW-08S, MW-10S, and MW-14S;
- Group 6 (clay and sandy clay) – MW-03S and MW-12S;

- Group 7 (clay and sandy clay) – MW-01S; and
- Group 8 (silt) – MW-25S (now INJ-36), MW-26S, MW-27S, and MW-29S.

4.1 Chlorinated VOCs

The RBCC for groundwater was calculated on a constituent and monitoring well location grouping-specific basis using site-specific groundwater attenuation factors, industrial worker RSLs for ambient air and constituent-specific Henry's law constants (USEPA, 2018b). The industrial worker RSLs were not changed from those in the RSL calculator using USEPA's standard exposure assumptions for an adult industrial worker reflecting a target cancer risk of 1.0×10^{-6} and target hazard quotient of 1.0, which is appropriate as PCE, TCE, and vinyl chloride have differing target organs (see Table 3). The target risk level of 1.0×10^{-6} and target hazard quotient of 1.0 were selected to demonstrate that if the concentrations of COPCs are at or below the proposed RBCCs, then the resulting risk would be within the acceptable USEPA target carcinogenic risk range of 1.0×10^{-6} to 1.0×10^{-4} and target organ-specific hazard quotient of 1.0.

The lower of the carcinogenic and non-carcinogenic adjusted ambient air RSL, was selected as the target indoor air concentration. Groundwater protective concentrations, defined as the maximum groundwater concentration that would be protective of indoor air, were then calculated using the methodology described in the USEPA VISL users guide (USEPA 2018c) using the following equation:

$$C_{gw} = \frac{C_{target,ia}}{HLC \times AF_{gw} \times \frac{1000 L}{m^3}}$$

Where:

- C_{gw} = maximum target groundwater concentration (microgram per liter [$\mu\text{g/l}$]);
- $C_{target,ia}$ = target indoor air concentration (microgram per cubic meter);
- AF_{gw} = attenuation factor (unit less);
- HLC = dimensionless Henry's Law constant (unit less).

Golder calculated the RBCC for each COPC for target risk levels consistent with EPA's acceptable risk range of 1E-04 to 1E-06 (NCP 1990; USEPA 1991; USEPA 2015), within each of the eight monitoring well location groups, results of which are in Table 3. From the eight groups, the lowest, i.e., most conservative, value derived for each COPC was selected as the final site-wide RBCC. The site-wide RBCC values for each COPC are as follows:

COPC	Calculated RBCC ($\mu\text{g/l}$)		
	1E-04 Risk	1E-05 Risk	1E-06 Risk
Tetrachloroethene	41,367 ^a	41,367 ^a	10,801
Trichloroethene	2,659 ^a	2,659 ^a	906
Vinyl Chloride	20,010	2,010	201

a- For PCE and TCE, the RBCC based on HQ = 1.0 is lower than the RBCC based on a cancer risk at 1E-05 and 1E-04 and therefore, the RBCC is set at the noncancer endpoint at a target hazard quotient of 1.

Consistent with USEPA guidance (2015), the RBCC at the 1E-06 risk level is the point of departure for the site with the understanding that the USEPA risk manager may “determine that a response action achieving reductions in human health risk within the 10-6 and 10-4 cancer risk is acceptable, however, depending upon site-specific conditions or remedial factors”. However, considering an environmental restrictive covenant (Deed Restriction) will be placed on the site to restrict future use to Industrial/Commercial Use, with site-wide groundwater use restrictions, the RBCC at the 1E-05 target risk (or HQ = 1 for TCE and PCE) would be appropriate and may be acceptable to USEPA to address the soil-vapor pathway for this site if the RBCC at 1E-06 cannot be achieved after remediation activities have been suspended. In addition, the proposed soil vapor study within the Remediation Area will be used to identify if VI is potentially complete at the site and if potential risks are present based on a comparison to USEPA screening criteria for soil vapor. Additional engineering (vapor) controls may also be employed in the Remediation Area, if warranted, based on post-remediation vapor studies.

4.2 Methane

The groundwater data from the site indicate that methane in soil gas is not likely to be at levels of concern. The 2016 United States Geological Survey (USGS) guidance indicates that methane has a solubility in water of 28 mg/l indicating that methane concentrations below this level will be, for the most part, in solution. As a precaution, USGS recommends that possible additional monitoring or preventive measures for methane be considered when methane concentrations in groundwater exceed a level of 10 mg/l. The dissolved methane at the site has a maximum concentration at MW-16S of 7.4 mg/l (sample date of July 26, 2016) with a more recent methane concentration at this well of 2.3 mg/l on June 20, 2017 with concentrations at other wells much lower. The recommended RBCC for methane in groundwater is 10 mg/l for the site. In addition, a soil gas screening level of 10% of the lower explosive limit for methane of 0.5% or 5,000 parts per million is recommended. This soil gas RBCC is consistent with USGS guidance and used by other states to manage methane risks in the subsurface (e.g., New York, West Virginia, Indiana).

Pfizer's also discussed with USEPA the potential for short-term increases in methane in the subsurface following amendment injections which may exert a demand for oxygen in the vadose zone during remedial activities.

5.0 RISK EVALUATION/MANAGEMENT

PCE concentrations in groundwater at the site have not exceeded their proposed RBCC concentrations since assessment and monitoring activities began in 2011. The highest concentrations of PCE detected at the site were 133 µg/l at MW-08S (for reference: RBCC for PCE at 1E-06 risk is 10,801 µg/l).

Prior to full-scale remedial implementation (fall 2015), TCE concentrations in groundwater were above the proposed RBCC in a number of monitoring and injection wells. As shown in Figures 7A and 7B, since full-scale implementation, TCE concentrations have substantially decreased, reducing the footprint of TCE impacts, below the proposed RBCC in groundwater. In the most recent round of sampling, September 2018, the sampling results show concentrations of TCE decreasing further and in some wells with previously high TCE concentrations (MW-07S, INJ-3 and INJ-39), these concentrations are now below the detection limits.

PCE concentrations have also decreased at the site (Figures 8A and 8B) although concentrations have been below the RBCC prior to remedial implementation. However, the noted decrease in TCE and PCE in groundwater is important in addressing the groundwater concentrations of vinyl chloride.

Vinyl chloride concentrations in groundwater were above the proposed RBCC in some of the monitoring and injection wells. Notably, some of these exceedances occurred only after full-scale remedial implementation, as

v vinyl chloride is generated from the degradation of PCE and TCE with significant levels of vinyl chloride-reductase observed. Consequently, after this initial spike after fall 2015, vinyl chloride concentrations have steadily decreased with the exception of more recently installed injection (treatment) wells which is expected given the treatment of TCE and PCE in these wells. The footprint of vinyl chloride exceedances of the RBCC has decreased within the Remediation Area (Figures 9A and 9B). Vinyl chloride concentrations will continue to degrade and decline, as supported by previous treatment results and the confirmed presence of vinyl chloride-reductase (biomarkers) at significant concentrations.

In addition to the application of RBCCs at the property, engineering controls may be implemented at the site (if warranted based on soil vapor data) during redevelopment, to further reduce potential risk to vapor intrusion within the Remediation Area.

6.0 UNCERTAINTY ANALYSIS

As is typical in risk evaluations, the use of generic screening criteria and development of risk-based criteria have associated uncertainties. These uncertainties are addressed by making protective assumptions such that risks are more likely to be overestimated than underestimated. The primary areas of uncertainty and associated limitations are qualitatively discussed in this section.

6.1 Screening Level Selection

The selection of VISLs used to select COPCs relies upon the use of toxicity values developed by the USEPA to evaluate potential chronic toxicity of COPCs. While these values may be estimated from human experimental or epidemiological data, they are more likely to be based on animal data generated from a variety of toxicological studies, which may over- or underestimate the potential for toxicity.

Inhalation toxicity values and RSLs are not available for some of the constituents (i.e., 1,1-dichloroethene, cis-1,2-dichloroethene, total 1,2-dichloroethene, ethane, ethene, and methane) detected at the site. As such, the potential for risk from the inhalation of these constituents cannot be quantitatively assessed.

There are no available screening criteria for soil to indoor air VISLs, primarily due to the high degree of uncertainty with estimating partitioning of VOCs from soil into soil vapor. While excluding soil from this evaluation may underestimate risks, the VOCs in soil at the site are only detected at depths greater than 20 feet bgs and, therefore, are unlikely to be a significant source of impacts to indoor air. In addition, the CVOCs in soil are not currently beneath any occupied structures at the site, are within the current remedial implementation area, and will likely decrease as remedial activities continue at the site due to these impacts being within the treatment area (shallow vadose zone).

6.2 Johnson & Ettinger Model

There are various sources of uncertainty in the evaluation of vapor intrusion risks using the J&E Model. As the dimensions of future site structures are unknown at this time, the building properties, dimensions, and foundation structures are also not known. These unknowns have the potential to over- or underestimate potential levels of attenuation, which in turn could result in either decreased or elevated RBCC. In addition, the use of conservative default soil properties for parameters for which site-specific values (e.g., bulk density, soil porosity) are not available has the potential to over- or underestimate RBCCs.

7.0 SUMMARY

Based on the results of this evaluation, the site COPCs for which RBCC's in groundwater were derived to address the soil-vapor pathway were PCE, TCE, and vinyl chloride. Maximum concentrations of PCE detected in groundwater have not exceeded their calculated RBCC even at the lower end of the USEPA's target risk range. Since full-scale implementation of the remedial activities, TCE concentrations have steadily decreased and in some wells within the treatment area have decreased to levels below the detection limit. While vinyl chloride concentrations have increased in some wells, this is to be expected during treatment as vinyl chloride is a breakdown product of PCE and TCE degradation. Overall, vinyl chloride and TCE concentrations have decreased to levels achieving the RBCC at 1E-05 in this memorandum (Table 4). Vinyl chloride concentrations will continue to decline as the degradation process continues. Groundwater monitoring and treatment of CVOCs (as warranted) in the Known Conditions Remedial Action Area, along with site institutional or engineering controls, will mitigate the potential for future exposures to soil vapor transport at the site. A soil-gas survey will be conducted to evaluate where engineering controls may be warranted (if any), with a work plan provided under separate cover.

8.0 REFERENCES

- Alpha Engineering Group. 2012. Carolina Well Inventory Report. Pfizer-Carolina, 65th Infantry, PR-3, Km. 9.7. Barrio Martin Gonzales, Carolina, Puerto Rico, 00987. March.
- Golder, 2012. Summary of human health risk assessment for Pfizer site in Carolina, Puerto Rico. May 29.
- Golder, 2014. Remedial Action Plan. Pfizer – Carolina Facility, Carolina, Puerto Rico. May.
- MADEP, 1995. Guidance for Disposal Site Risk Characterization: In Support of the Massachusetts Contingency Plan. Interim Final Policy #WSC/ORS-95-141. Bureau of Waste Site Cleanup and Office of Research and Standards. July.
- NCP. 1990. National Oil and Hazardous Substances Pollution Contingency Plan. 40 CFR Part 300, Fed Reg 55:8666 March 8.
- PADEP, 2018. Pennsylvania Bulletin: Rules and Regulations, Title 25 – Environmental Protection. Administration of the Land Recycling Program. 25 Pa. Code Ch. 250 Appendix A, Table 4. Medium-Specific Concentrations (MSCs). Vol 48 (11) March.
- USEPA, 1991. Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions. Office of Solid Waste and Emergency Response. OSWER Directive 9355.0-30. April 22.
- USEPA, 2004. Johnson & Ettinger Model for Subsurface Vapor Intrusion into Buildings. Last updated June 2004. Located at <https://www.USEPA.gov/vaporintrusion/USEPA-spreadsheet-modeling-subsurface-vapor-intrusion>
- USEPA, 2009. Risk Assessment Guidance for Superfund. Volume 1: Human Health Evaluation Manual. Part F, Supplemental Guidance for Inhalation Risk Assessment. Office of Solid Waste and Emergency Response. Pub No. 9285.7-82. January.
- USEPA, 2015. OSWER Technical Guidance for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Sources to Indoor Air. Office of Solid Waste and Emergency Response. Pub No. 9200.2-154. June.
- USEPA, 2017. Documentation for EPA's Implementation of the Johnson and Ettinger Model to Evaluate Site Specific Vapor Intrusion into Buildings. Version 6.0. Office of Superfund Remediation and Technology Innovation. September.
- USEPA, 2018a. Vapor Intrusion Screening Levels calculator. Accessed June 15, 2018. Available at: <https://www.USEPA.gov/vaporintrusion/vapor-intrusion-screening-level-calculator>

USEPA, 2018b. Regional Screening Level Tables – May 2018. Available at: http://www.USEPA.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm

USEPA, 2018c. VISL User's Guide – May 2018. Available at: <https://www.USEPA.gov/vaporintrusion/visl-users-guide>

List of Tables

- Table 1 Occurrence, Distribution, and Selection of Chemicals of Potential Concern in Groundwater
- Table 2 Occurrence, Distribution, and Selection of Chemicals of Potential Concern in Soil
- Table 3 Risk-Based Closure Concentrations for the Carolina Groundwater
- Table 4 Comparison of RBCC to Groundwater Data

List of Figures

- Figure 1 Site Location Map
- Figure 2A Site Plan
- Figure 2B Pre-Demo/Pre-2013 Site Plan
- Figure 3 Soil Boring Locations
- Figure 4 Soil Analytical Results
- Figure 5 Remedial Action Area Map
- Figure 6 Groundwater Data Locations
- Figure 7A Groundwater Analytical Summary for TCE (w/ Pre-Injection Iso-contours)
- Figure 7B Groundwater Analytical Summary for TCE (w/ Post-Injection Iso-contours) (September 2018)
- Figure 8A Groundwater Analytical Summary for PCE (w/ Pre-Injection Iso-contours)
- Figure 8B Groundwater Analytical Summary for PCE (w/ Post-Injection Iso-contours) (September 2018)
- Figure 9A Groundwater Analytical Summary for Vinyl Chloride (w/ Pre-Injection Iso-contours)
- Figure 9B Groundwater Analytical Summary for Vinyl Chloride (w/ Post-Injection Iso-contours) (September 2018)

List of Attachments

- Attachment A Restrictive Covenant for the Site
- Attachment B Sampling Data Set
- Attachment C Depth to Groundwater Evaluation
- Attachment D Soil Classification Results
- Attachment E Johnson & Ettinger Models

TABLES

TABLE 1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN IN GROUNDWATER

Pfizer, Inc.
Carolina, Puerto Rico

Exposure Point	CAS Number	Constituent	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Method Detection Limits	Concentration Used for Screening (2)	Background Value (3)	Risk-Based Vapor Intrusion Screening Levels ($\mu\text{g/l}$) (N/C) (4)	Potential ARAR Value ($\mu\text{g/l}$)	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)				
Vapor Intrusion to Indoor Air - Shallow GW	75-35-4	Dichloroethylene, 1,1-	0.50	--	68	--	$\mu\text{g/l}$	MW-17S	150/218	0.50	50	68	NA	82	n	NA	N	BSL	
	156-59-2	Dichloroethylene, 1,2-cis-	0.50	--	10,200	--	$\mu\text{g/l}$	MW-17S	206/218	0.50	12	10,200	NA	--	NA	NA	N	NSL	
	156-60-5	Dichloroethylene, 1,2 (total)	0.50	--	10,300	--	$\mu\text{g/l}$	MW-17S	208/218	0.50	0.50	10,300	NA	--	NA	NA	N	NSL	
	74-84-0	Ethane	0.01	--	86	--	$\mu\text{g/l}$	MW-16S	45/54	0.018	4.9	86	NA	NA	--	NA	NA	NSL	
	74-85-1	Ethene	0.022	I	110	--	$\mu\text{g/l}$	INJ-7	52/54	0.20	0.68	110	NA	NA	--	NA	NA	N	NSL
	74-82-8	Methane	0.12	I	7,410	--	$\mu\text{g/l}$	MW-16S	53/54	0.20	0.20	7,410	NA	NA	--	NA	NA	N	NSL
	127-18-4	Tetrachloroethylene	0.50	--	133	--	$\mu\text{g/l}$	MW-03S	73/218	0.50	50	133	NA	24	n	NA	NA	Y	ASL
	79-01-6	Trichloroethylene	0.56	I	5,930	--	$\mu\text{g/l}$	MW-17S	195/218	0.50	12	5,930	NA	2.2	n	NA	NA	Y	ASL
	75-01-4	Vinyl Chloride	1.0	--	2,570	--	$\mu\text{g/l}$	MW-16S	186/218	0.50	12	2,570	NA	2.5	c	NA	NA	Y	ASL

Notes:

(1) I - The reported value is between the laboratory MDL and the laboratory practical quantitation limit (PQL).

(2) Maximum detected concentration used for screening.

(3) No background value available.

(4) All compounds are screened against the Environmental Protection Agency's (EPA) Vapor Intrusion Screening Levels online calculator dated March 2018 (cancer benchmark value = 1E-06; HQ = 0.1).

(5) Rationale Codes Selection Reason: Above Screening Level (ASL)

Deletion Reason: Below Screening Level (BSL)

No Screening Level (NSL)

Definitions:

NA - Not Applicable

COPC - Constituent of Potential Concern

ARAR - Applicable or Relevant and Appropriate Requirement

n - Noncarcinogen

c - Carcinogen

Y - Yes

N - No

 $\mu\text{g/l}$ - micrograms per liter

TABLE 2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN IN SOIL

Pfizer, Inc.
Carolina, Puerto Rico

Exposure Point	CAS Number	Constituent	Minimum Concentration (Qualifier) (1)		Maximum Concentration (Qualifier) (1)		Units	Location of Maximum Concentration	Detection Frequency	Range of Method Detection Limits		Concentration Used for Screening (2)	Background Value (3)	Risk-Based Vapor Intrusion Screening Levels ($\mu\text{g/L}$) (N/C) (4)		Potential ARAR Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
Vapor Intrusion to Indoor Air - Soil	156-59-2	Dichloroethylene, 1,2-cis-	0.0034	I	0.56	--	mg/kg	TB-43	12/42	0.0013	0.012	0.56	NA	NA	--	NA	NA	N	NSL
	156-60-5	Dichloroethylene, 1,2 (trans)	0.0041	I	0.0043	I	mg/kg	TB-43	2/42	0.0016	0.014	0.0043	NA	NA	--	NA	NA	N	NSL
	67-66-3	Chloroform	0.0035	--	0.0045	I	mg/kg	TB-52	2/18	0.0024	0.0049	0.0045	NA	NA	--	NA	NA	N	NSL
	PRO	Petroleum Range Organics	29	--	935	--	mg/kg	TB-33	2/6	4.9	25	935	NA	NA	--	NA	NA	N	NSL
	127-18-4	Tetrachloroethylene	0.0028	I	0.0053	--	mg/kg	TB-54	2/42	0.0013	0.012	0.0053	NA	NA	--	NA	NA	N	NSL
	79-01-6	Trichloroethylene	0.0032	I	6.3	--	mg/kg	TB-52	15/42	0.0014	0.013	6.3	NA	NA	--	NA	NA	N	NSL
	75-01-4	Vinyl Chloride	0.0035	I	0.045	--	mg/kg	TB-43	7/42	0.0014	0.013	0.045	NA	NA	--	NA	NA	N	NSL

Notes:

(1) I - The reported value is between the laboratory MDL and the laboratory practical quantitation limit (PQL).

(2) Maximum detected concentration used for screening.

(3) No background value available.

(4) Rationale Codes

Definitions:

NA - Not Applicable

N - No

COPC - Constituent of Potential Concern

mg/kg - milligrams per kilogram

ARAR - Applicable or Relevant and Appropriate Requirement

No Screening Level (NSL)

TABLE 3
RISK-BASED CLOSURE CONCENTRATIONS FOR GROUNDWATER

Pfizer, Inc.
Carolina, Puerto Rico

CAS	Constituent of Potential Concern ¹	Attenuation Factor (unitless) ²	Henry's Law Constant (unitless) ³	Indoor Air RSL ⁴			Groundwater Risk-Based Closure Criteria		
				Carcinogenic Value (ug/m ³)	Non-Carcinogenic Value (ug/m ³)	Target Organ ⁵	Value (1E-06 risk)	Value (HQ = 1.0)	Units
Group 1									
79-01-6	Trichloroethylene	8.9E-06	0.40	3.0	8.8	Immunological/Developmental/Cardiac	844	2,475	µg/l
Group 2									
127-18-4	Tetrachloroethylene	1.2E-06	0.72	47	180	Neurological/Ocular	53,608	205,307	µg/l
79-01-6	Trichloroethylene	1.8E-06	0.40	3.0	8.8	Immunological/Developmental/Cardiac	4,085	11,982	µg/l
75-01-4	Vinyl Chloride	2.2E-06	1.1	2.8	440	Liver	1,171	184,077	µg/l
Group 3									
127-18-4	Tetrachloroethylene	1.5E-06	0.72	47	180	Neurological/Ocular	44,510	170,462	µg/l
79-01-6	Trichloroethylene	2.4E-06	0.40	3.0	8.8	Immunological/Developmental/Cardiac	3,153	9,250	µg/l
75-01-4	Vinyl Chloride	2.2E-06	1.1	2.8	440	Liver	1,150	180,780	µg/l
Group 4									
127-18-4	Tetrachloroethylene	5.9E-06	0.72	47	180	Neurological/Ocular	11,049	42,314	µg/l
79-01-6	Trichloroethylene	8.1E-06	0.40	3.0	8.8	Immunological/Developmental/Cardiac	927	2,720	µg/l
75-01-4	Vinyl Chloride	1.2E-05	1.1	2.8	440	Liver	205	32,289	µg/l
Group 5									
127-18-4	Tetrachloroethylene	6.0E-06	0.72	47	180	Neurological/Ocular	10,801	41,367	µg/l
79-01-6	Trichloroethylene	8.3E-06	0.40	3	8.8	Immunological/Developmental/Cardiac	906	2,659	µg/l
75-01-4	Vinyl Chloride	1.3E-05	1.1	2.8	440	Liver	201	31,575	µg/l
Group 6									
127-18-4	Tetrachloroethylene	1.5E-06	0.72	47	180	Neurological/Ocular	43,041	164,837	µg/l
79-01-6	Trichloroethylene	2.5E-06	0.40	3.0	8.8	Immunological/Developmental/Cardiac	3,029	8,886	µg/l
75-01-4	Vinyl Chloride	2.3E-06	1.1	2.8	440	Liver	1,123	176,539	µg/l
Group 7									
127-18-4	Tetrachloroethylene	1.5E-06	0.72	47	180	Neurological/Ocular	44,510	170,462	µg/l
79-01-6	Trichloroethylene	2.4E-06	0.40	3.0	8.8	Immunological/Developmental/Cardiac	3,153	9,250	µg/l

TABLE 3
RISK-BASED CLOSURE CONCENTRATIONS FOR GROUNDWATER

**Pfizer, Inc.
Carolina, Puerto Rico**

CAS	Constituent of Potential Concern ¹	Attenuation Factor (unitless) ²	Henry's Law Constant (unitless) ³	Indoor Air RSL ⁴			Groundwater Risk-Based Closure Criteria		
				Carcinogenic Value (ug/m ³)	Non-Carcinogenic Value (ug/m ³)	Target Organ ⁵	Value (1E-06 risk)	Value (HQ = 1.0)	Units
Group 8									
127-18-4	Tetrachloroethylene	6.0E-06	0.72	47	180	Neurological/Ocular	10,884	41,683	µg/l
79-01-6	Trichloroethylene	8.2E-06	0.40	3.0	8.8	Immunological/Developmental/Cardiac	913	2,679	µg/l
75-01-4	Vinyl Chloride	1.3E-05	1.1	2.8	440	Liver	202	31,813	µg/l
Site-Wide⁶									
127-18-4	Tetrachloroethylene	6.0E-06	0.72	47	180	Neurological/Ocular	10,801	41,367	µg/l
79-01-6	Trichloroethylene	8.3E-06	0.40	3.0	8.8	Immunological/Developmental/Cardiac	906	2,659	µg/l
75-01-4	Vinyl Chloride	1.3E-05	1.1	2.8	440	Liver	201	31,575	µg/l
Notes:									
(1) Constituents on this table exceed their risk-based VISLs.									
(2) Maximum Detected Concentrations represent the maximum concentration detected in the primary samples used in the analysis.									
(2) Site-specific attenuation factors calculated using the USEPA Johnson & Ettinger Model, as presented in Attachment E.									
(3) Taken from the USEPA RSL table, dated May 2018.									
(4) Taken from the USEPA RSL tables for industrial worker ambient air for a target cancer risk of 1.0E-06 and HQ of 1.0.									
(5) Target organs taken from the USEPA IRIS database profile for each COC, which is the source of the toxicity factor used to determine the non-cancer RSL value.									
(6) Site-wide RBCC are based on the groups within the Known Conditions Remedial Action Area (Figure 5) and do not include those groups where injections have not occurred (i.e., Group 1).									

TABLE 4
COMPARISON OF RBCC TO GROUNDWATER DATA

Pfizer, Inc.
Carolina, Puerto Rico

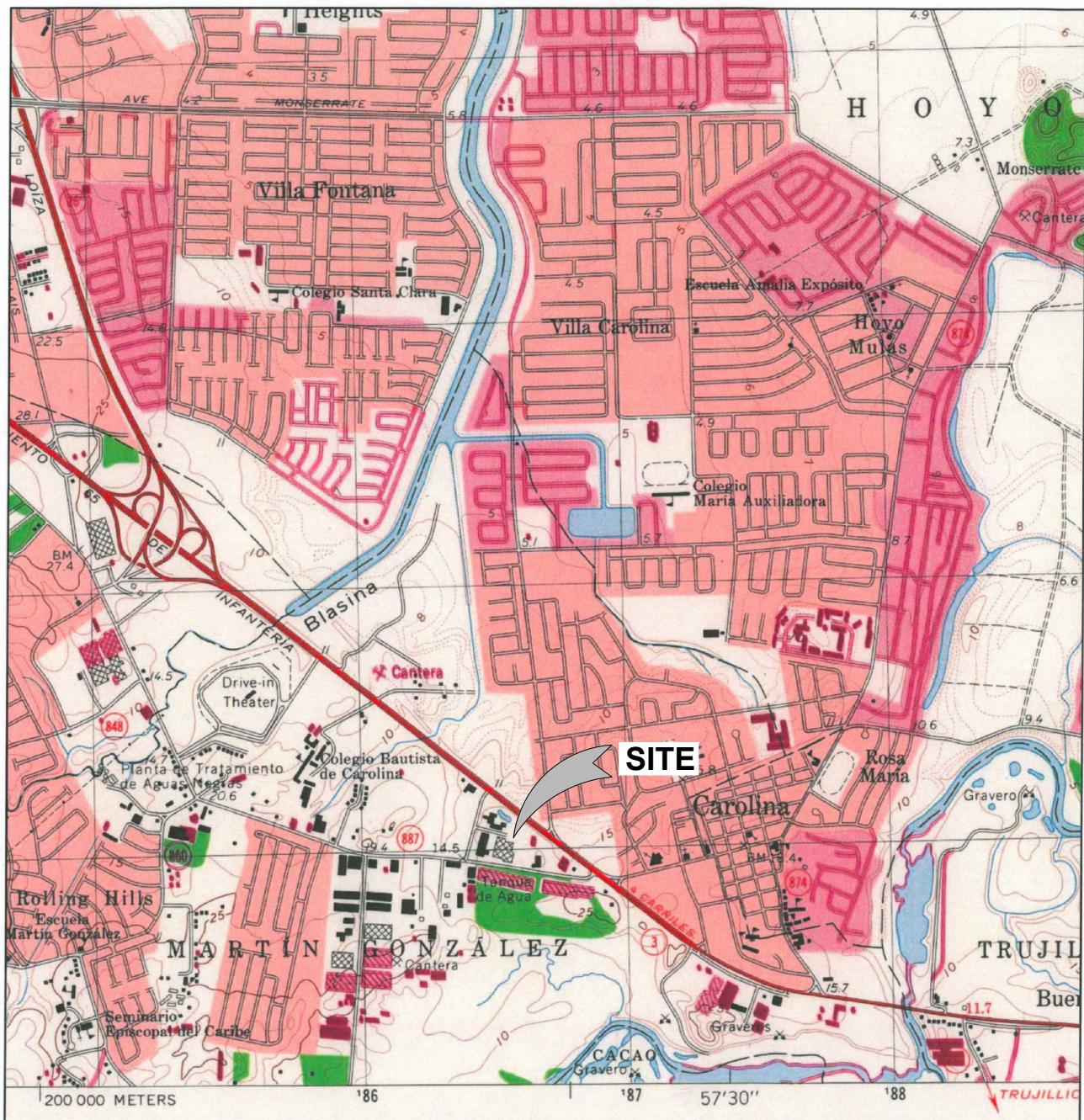
CAS	Constituent of Potential Concern¹	Units	Maximum Detected Concentration²	Recent Maximum Concentration (2018)	Groundwater RBCC			
					(1E-05 target risk)³	(1E-06 target risk)		
Group 1								
79-01-6	Trichloroethylene	µg/l	26	MW-06S (12/05/2013)	8.0	MW-09S (09/20/2018)	2,475	844
Group 2								
127-18-4	Tetrachloroethylene	µg/l	3.0	MW-07S (04/17/2013)	0.74	MW-11S (09/21/2018)	41,367	10,801
79-01-6	Trichloroethylene	µg/l	1,970	MW-21S (08/11/2015)	128	MW-11S (09/21/2018)	2,659	906
75-01-4	Vinyl Chloride	µg/l	1,060	MW-07S (01/17/2016)	351	MW-21S (01/23/2018)	2,009	201
Group 3								
127-18-4	Tetrachloroethylene	µg/l	5.9	INJ-24 (01/17/2016)	0.8	INJ-30 (01/24/2018)	41,367	10,801
79-01-6	Trichloroethylene	µg/l	4,000	MW-16S (02/03/2015)	763	INJ-24 (01/25/2018)	2,659	906
75-01-4	Vinyl Chloride	µg/l	2,570	MW-16S (12/04/2015)	1,910	INJ-23 (01/25/2018)	2,009	201
Group 4								
127-18-4	Tetrachloroethylene	µg/l	3.5	MW-13S (12/02/2013)	0.5 U	*all sampled wells	41,367	10,801
79-01-6	Trichloroethylene	µg/l	5,930	MW-17S (02/04/2015)	14	MW-20S (09/18/2018)	2,659	906
75-01-4	Vinyl Chloride	µg/l	1,830	MW-13S (08/07/2015)	343	MW-18S (01/25/2018)	2,009	201
Group 5								
127-18-4	Tetrachloroethylene	µg/l	31.4	MW-08S (09/12/2012)	30.6	MW-10S (09/20/2018)	41,367	10,801
79-01-6	Trichloroethylene	µg/l	12	MW-08S (10/17/2011)	14.4	MW-10S (09/20/2018)	2,659	906
75-01-4	Vinyl Chloride	µg/l	2.1	MW-08S (10/17/2011)	1.8	MW-10S (09/20/2018)	2,009	201
Group 6								
127-18-4	Tetrachloroethylene	µg/l	133	MW-03S (10/18/2011)	89	MW-03S (09/20/2018)	41,367	10,801
79-01-6	Trichloroethylene	µg/l	109	MW-12S (12/02/2013)	119	MW-12S (09/21/2018)	2,659	906
75-01-4	Vinyl Chloride	µg/l	6.3	MW-03S (12/04/2013)	2.1	MW-03S (09/20/2018)	2,009	201

TABLE 4
COMPARISON OF RBCC TO GROUNDWATER DATA

Pfizer, Inc.
Carolina, Puerto Rico

CAS	Constituent of Potential Concern¹	Units	Maximum Detected Concentration²	Recent Maximum Concentration (2018)	Groundwater RBCC			
					(1E-05 target risk)³	(1E-06 target risk)		
Group 7								
127-18-4	Tetrachloroethylene	µg/l	0.72	MW-01S (09/12/2012)	1.0	MW-01S (09/19/2018)	41,367	10,801
79-01-6	Trichloroethylene	µg/l	3.2	MW-01S (10/17/2011)	1.6	MW-01S (09/19/2018)	2,659	906
Group 8								
127-18-4	Tetrachloroethylene	µg/l	17.7	MW-26S (06/21/2017)	0.5 U	*all sampled wells	41,367	10,801
79-01-6	Trichloroethylene	µg/l	4,770	INJ-36 (11/18/2016)	6	INJ-36 (01/24/2018)	2,659	906
75-01-4	Vinyl Chloride	µg/l	198	INJ-36 (06/20/2017)	285	INJ-36 (01/24/2018)	2,009	201
Site-Wide								
127-18-4	Tetrachloroethylene	µg/l	133	MW-03S (10/18/2011)	89	MW-03S (09/20/2018)	41,367	10,801
79-01-6	Trichloroethylene	µg/l	5,930	MW-13S (12/02/2013)	763	INJ-24 (01/25/2018)	2,659	906
75-01-4	Vinyl Chloride	µg/l	2,570	MW-16S (12/04/2015)	1,910	INJ-23 (01/25/2018)	2,009	201
Notes:								
(1) Constituents on this table exceed their risk-based VISLs.								
(2) Maximum Detected Concentrations represent the maximum concentration detected in the primary samples used in the analysis.								
(3) For TCE and PCE, the RBCC based on a HQ of 1 is lower than the RBCC based on a cancer risk of 1E-05 and therefore, the non-cancer based RBCC is presented.								
(4) Site-wide RBCC are based on the groups within the Known Conditions Remedial Action Area (Figure 5) and do not include those groups where injections have not occurred (i.e., Group 1).								

FIGURES



REFERENCE(S)

- 1.) USGS TOPOGRAPHIC MAP. 7.5 MINUTE QUADRANGLE MAP SERIES: CAROLINA, PUERTO RICO QUADRANGLE, DATED 1969, PHOTOREVISED 1982.

0 1000 2000
APPROXIMATE SCALE FEET

CLIENT
Pfizer

PROJECT
Pfizer-CAROLINA, PUERTO RICO

CONSULTANT

YYYY-MM-DD 2018-07-23

DESIGNED GG/MCC

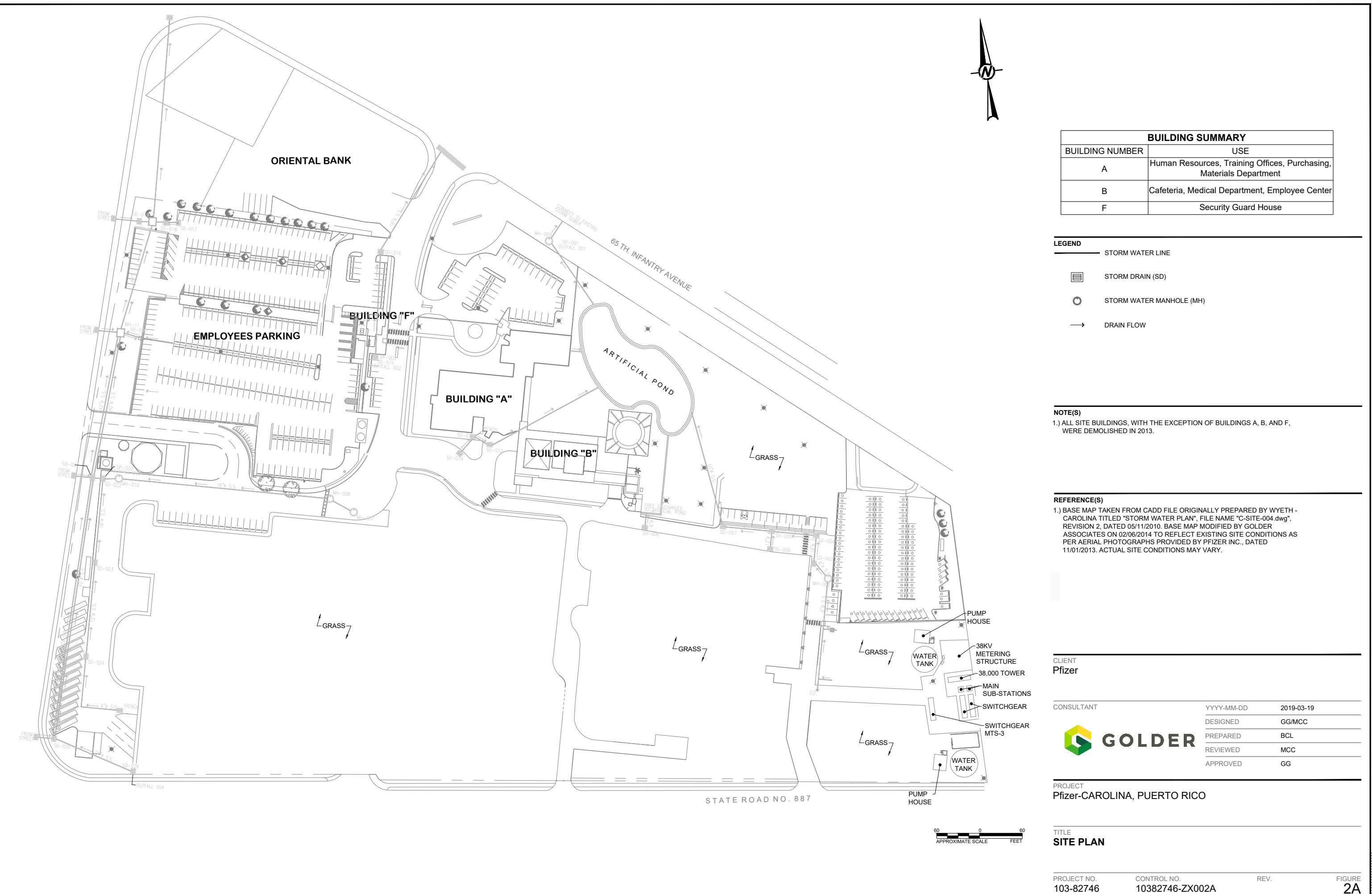
PREPARED BCL

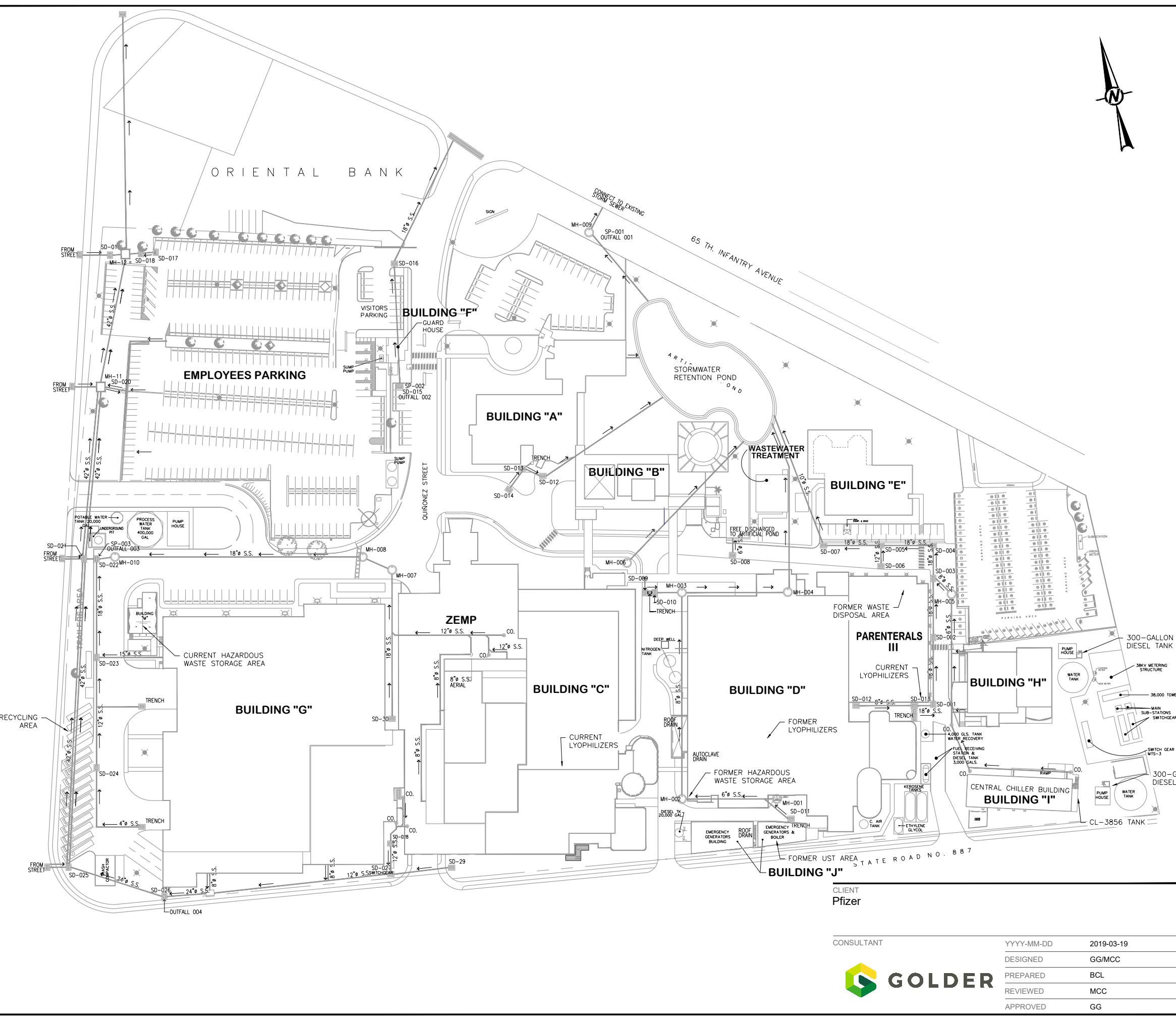
REVIEWED .JG

APPROVED .MC

TITLE
SITE LOCATION MAP

PROJECT NO. 103-82746 **Control No.** 10382746-ZR001**REV.****FIGURE****1**







LEGEND

- SOIL BORING LOCATION
- SOIL BORING LOCATION WITH SOIL OVA DATA
- SOIL BORING LOCATION WITH SOIL ANALYTICAL DATA
- SOIL BORING LOCATION WITH BOTH SOIL OVA AND SOIL ANALYTICAL DATA

NOTE(S)

- ALL SITE BUILDINGS WITH THE EXCEPTION OF BUILDINGS A, B, AND F WERE DEMOLISHED IN 2013.
- OVA = ORGANIC VAPOR ANALYZER SOIL HEADSPACE READING.
- SOIL BORING OVA DATA CAN BE FOUND IN TABLE 1. SOIL BORING ANALYTICAL DATA CAN BE FOUND IN TABLE 2.

REFERENCE(S)

- BASEMAP TAKEN FROM WYETH - CAROLINA, FILE NAME "C-SITE-004.dwg", TITLED "STORM WATER PLAN", DATED 08/18/2008.

CLIENT

Pfizer

CONSULTANT

YYYY-MM-DD	2018-07-23
DESIGNED	GG/MCC
PREPARED	BCL
REVIEWED	. GJG
APPROVED	MC

PROJECT

Pfizer-CAROLINA, PUERTO RICO

TITLE

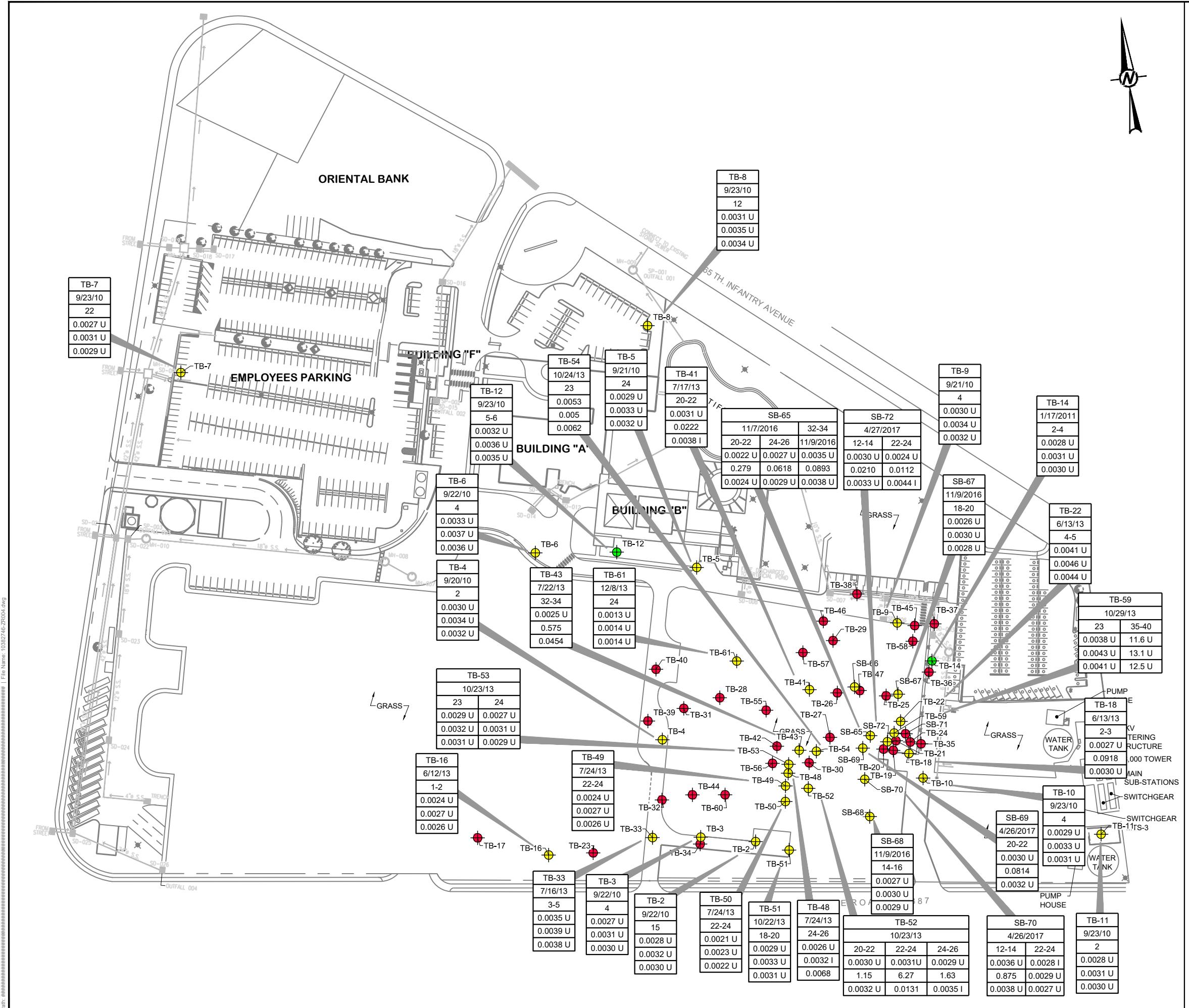
SOIL BORING LOCATIONS

PROJECT NO.
103-82746

CONTROL NO.
10382746-ZR003

REV.

FIGURE
3





Path: \\Jacksonville\\drafting\\FIRE\\2010\\103-827746 Pfizer-Carolina Phase II\\ZL - 2017 Full Scale Implementation\\Active Drawings | File Name: 10382746-ZR005.dwg

LEGEND

- SHALLOW MONITORING WELL
 - DEEP MONITORING WELL
 - BEDROCK INJECTION TREATMENT WELL
(SCREEN INTERVAL ~20 TO 40 FEET-BGS)
 - OVERBURDEN INJECTION TREATMENT WELL (SCREEN INTERVAL ~40 TO 50 FEET BGS)
 - OVERBURDEN INJECTION TREATMENT WELL (SCREEN INTERVAL ~50 TO 60 FEET BGS)
 - INJECTION TREATMENT WELL LOCATION (OVERBURDEN)
 - TEMPORARY MONITORING WELL
 - SOIL BORING LOCATION
 - GENERAL EXTENT OF KNOWN CONDITION TO UNDERGO REMEDIAL ACTION

NOTE(S)

- 1.) ALL SITE BUILDINGS WITH THE EXCEPTION OF BUILDINGS A, B, AND F WERE DEMOLISHED IN 2013.

REFERENCE(S)

- REFERENCE(S)**

1.) BASEMAP TAKEN FROM WYETH - CAROLINA, FILE NAME
"C-SITE-004.dwg" TITLED "STORM WATER PLAN" DATED 08/18/2008

CLIENT
Pfizer

◎ 中国书画函授大学

YYYY-MM-DD	2018-07-23
DESIGNED	GG/MCC
PREPARED	BCL
REVIEWED	GJG
APPROVED	MCC

PROJECT
Pfizer-CAROLINA, PUERTO RICO

TITLE

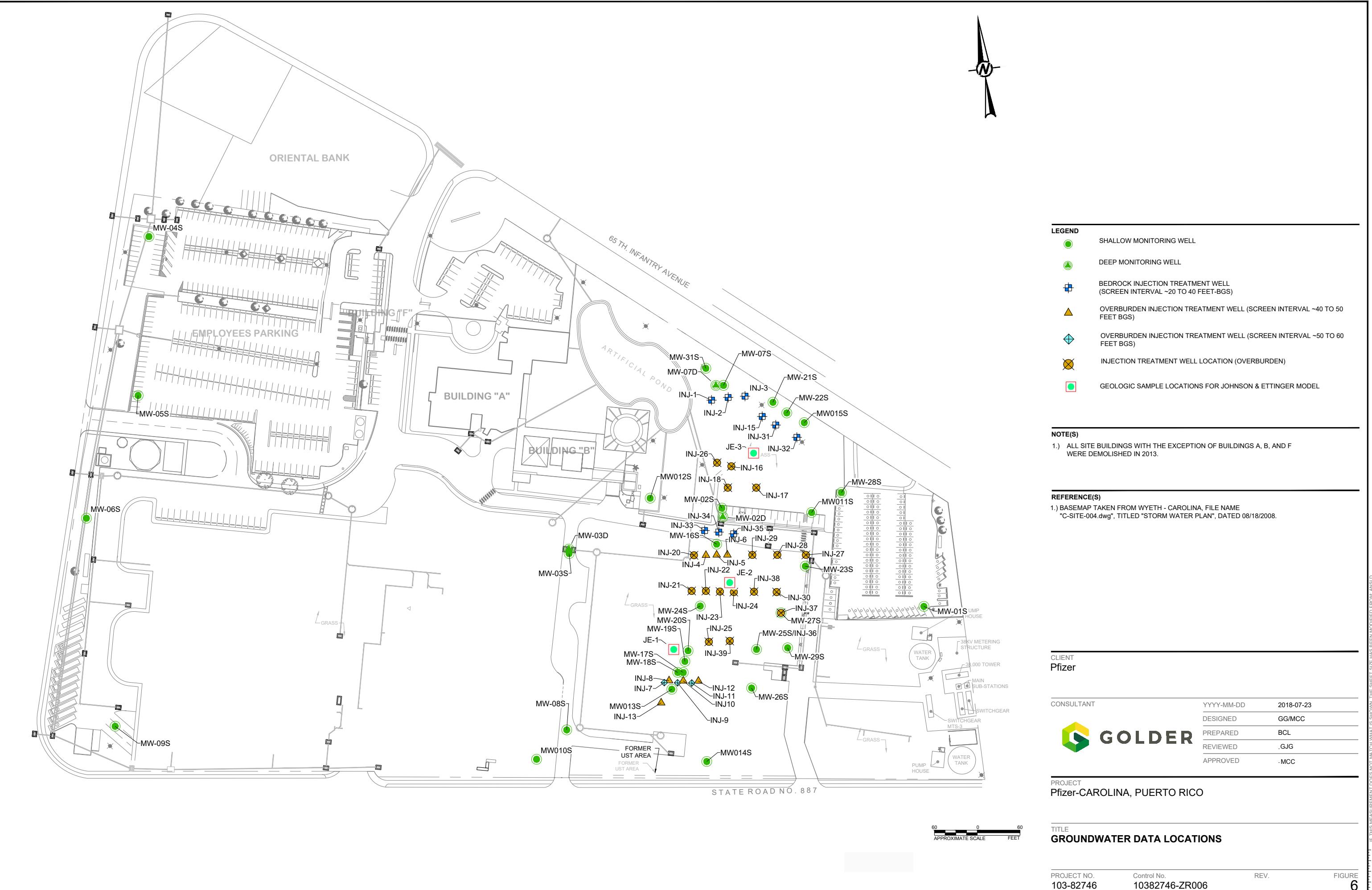
REMEDIAL ACTION AREA MAP

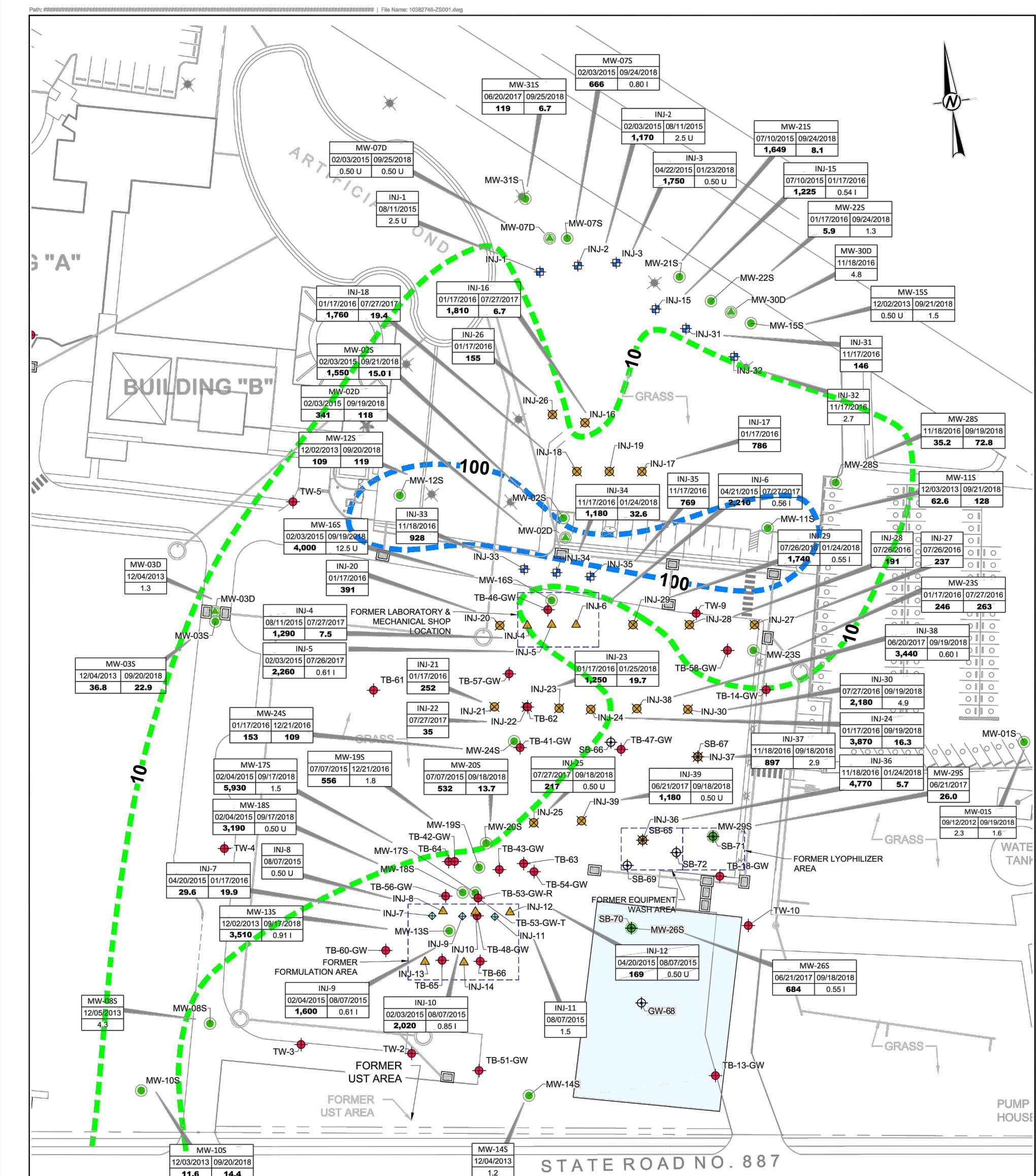
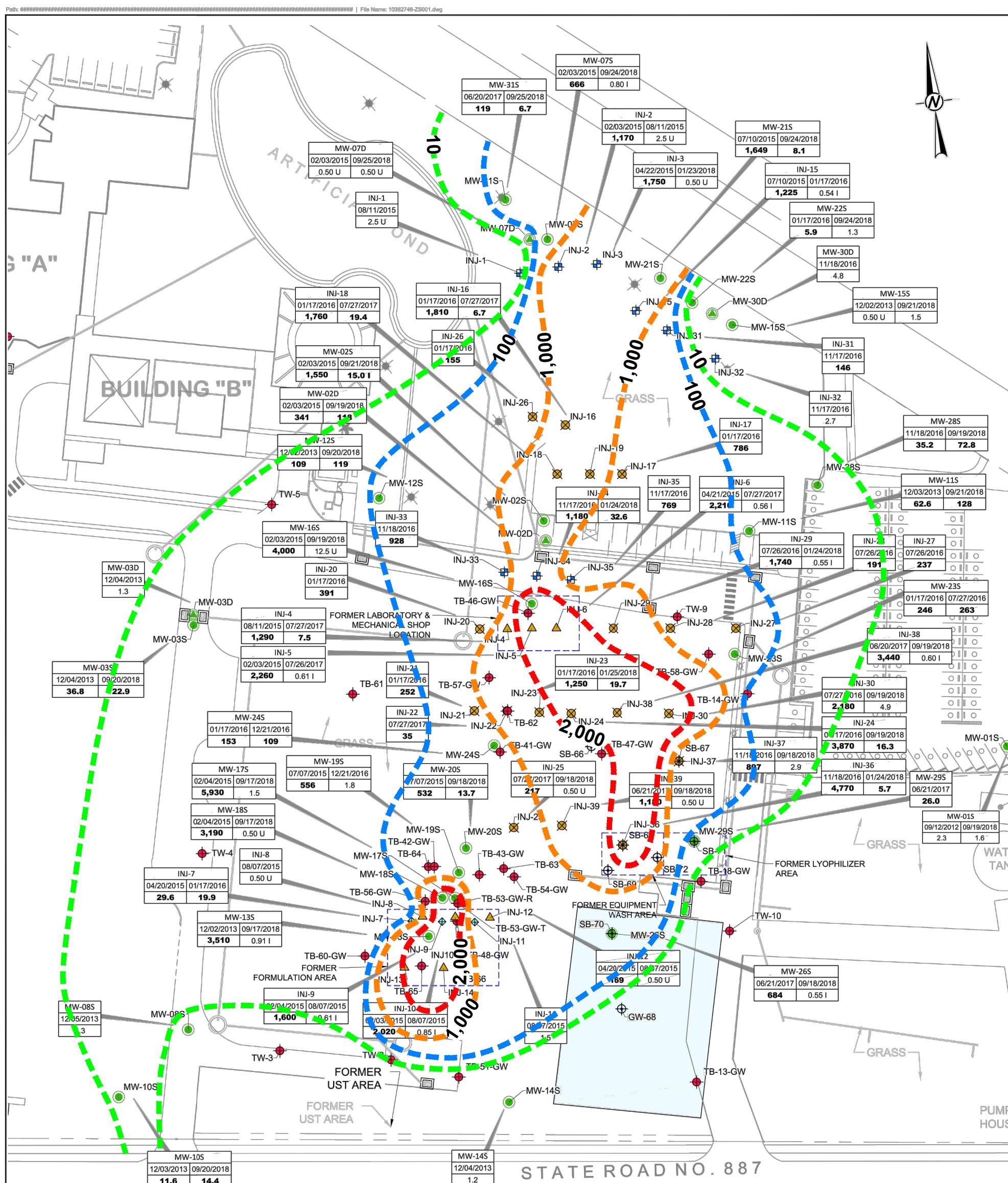
PROJECT NO.
103-82746

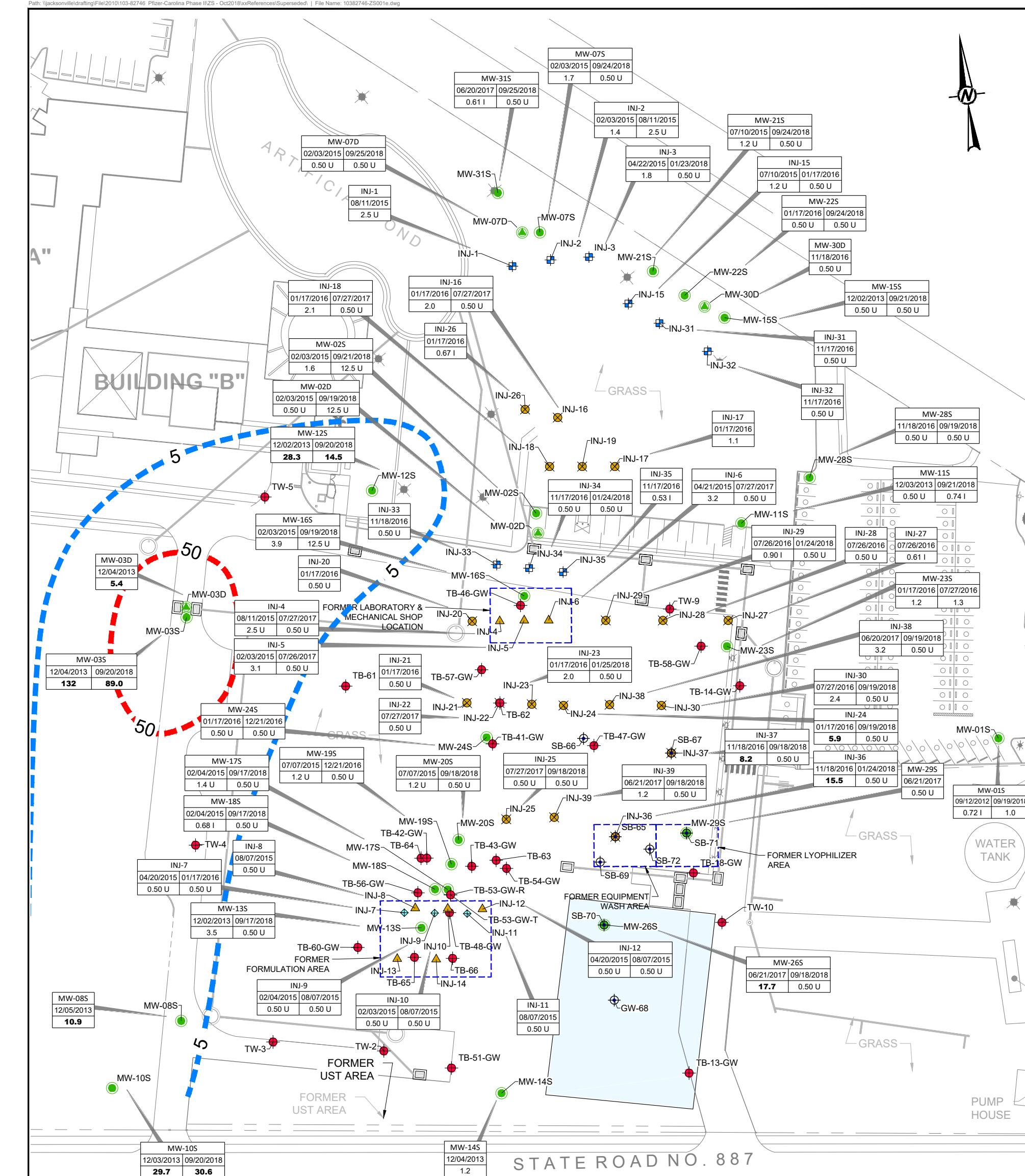
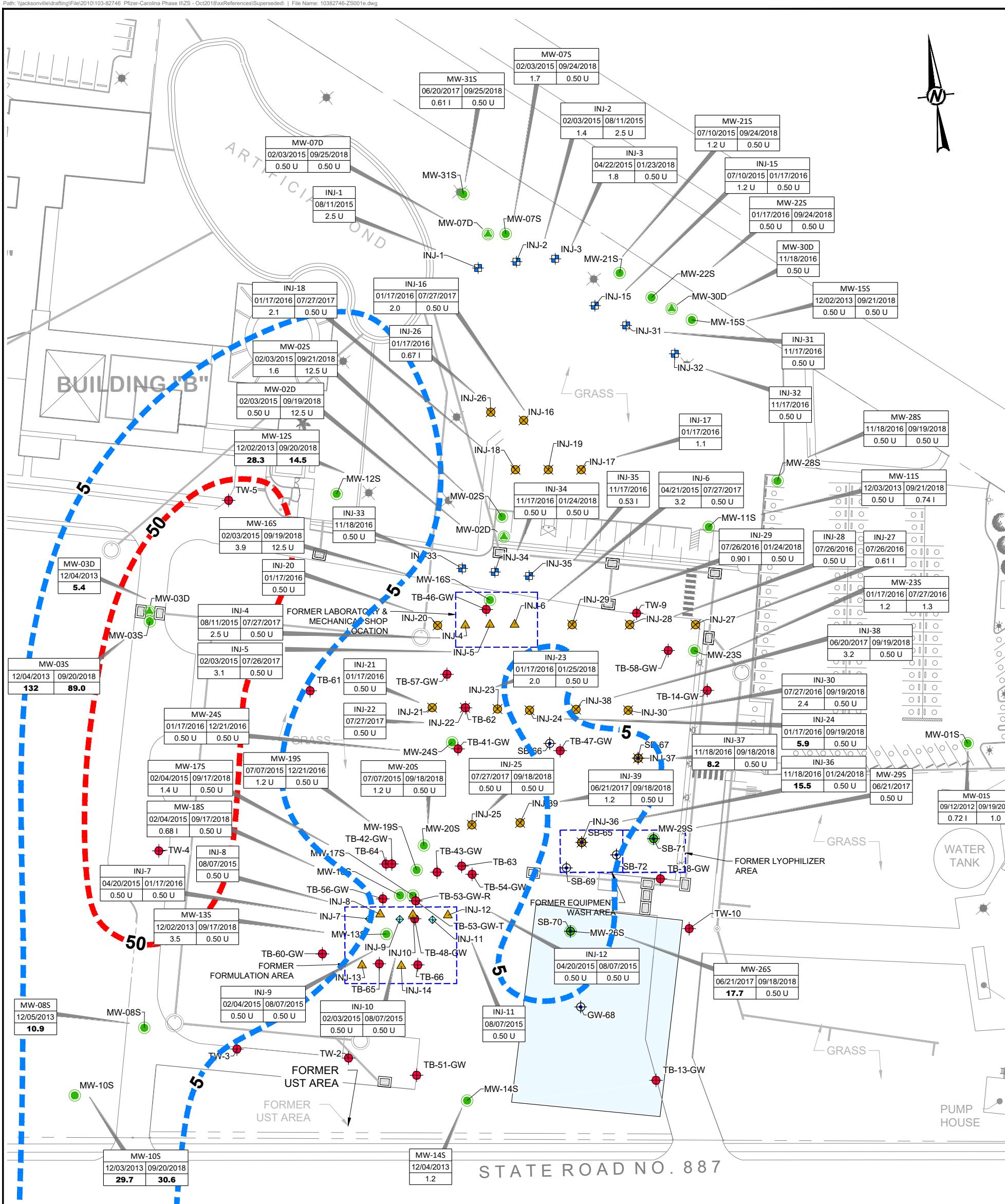
Control No.
10382746-ZR005

REV.

FIGURE 5







LEGEND

	SHALLOW MONITORING WELL	 1/17/16 5	WELL ID No. DATE SAMPLED PCE IN MICROGRAMS PER L
	DEEP MONITORING WELL		
	BEDROCK INJECTION TREATMENT WELL (SCREEN INTERVAL ~20 TO 40 FEET-BGS)		
	OVERBURDEN INJECTION TREATMENT WELL (SCREEN INTERVAL ~40 TO 50 FEET BGS)		
	OVERBURDEN INJECTION TREATMENT WELL (SCREEN INTERVAL ~50 TO 60 FEET BGS)		
	INJECTION TREATMENT WELL LOCATION (OVERBURDEN)		
	TEMPORARY MONITORING WELL		
	SOIL BORING LOCATION	> 5 µg/L > 50 µg/L	PRE-INJECT MAXIMUM C FOLLOWING
OCTOBER 2013 EXCAVATION AREA			

NOTE(S)

1. ALL SITE BUILDINGS WITH THE EXCEPTION OF BUILDINGS A, B, AND F WERE DEMOLISHED IN 2013.
2. U - INDICATES THAT THE COMPOUND WAS ANALYZED FOR BUT NOT DETECTED.
3. I - REPORTED VALUE IS BETWEEN THE LABORATORY METHOD DETECTION LIMIT AND THE LABORATORY PRACTICAL QUANTITATION LIMIT.

REFERENCE(S)

CLIENT Pfizer	PROJECT Pfizer-CAROLINA
CONSULTANT	TITLE GROUNDWATER ANALYTICAL SUMMARY FOR PCE (w/ PRE-INJECTION ISOCONTOURS)
 GOLDER	PROJECT NO. 103-82746
	Control No. 10382746-ZS001e
YYYY-MM-DD DESIGNED PREPARED REVIEWED APPROVED	2019-03-13 MCC BCL MCC JP
REV.	.

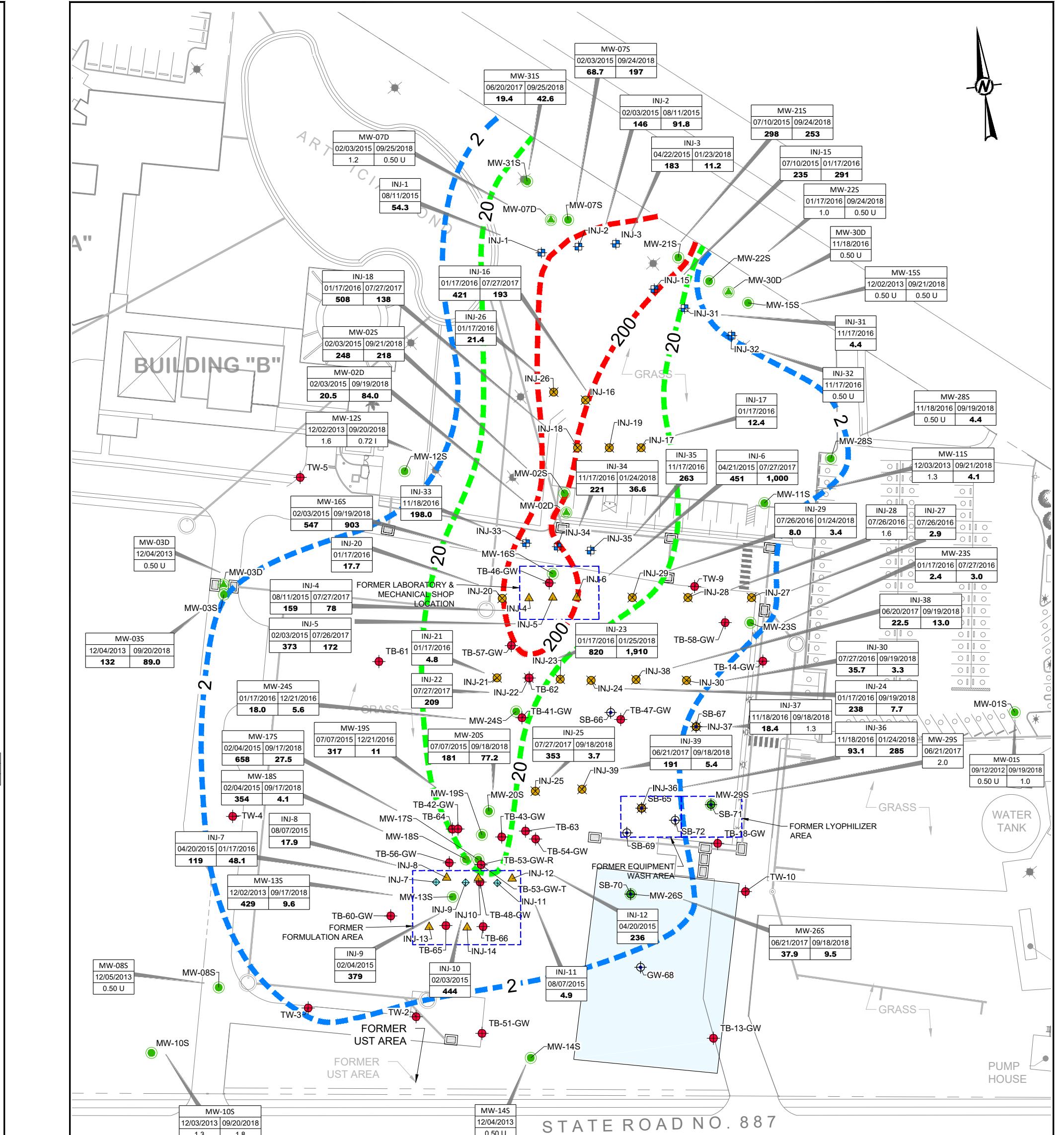
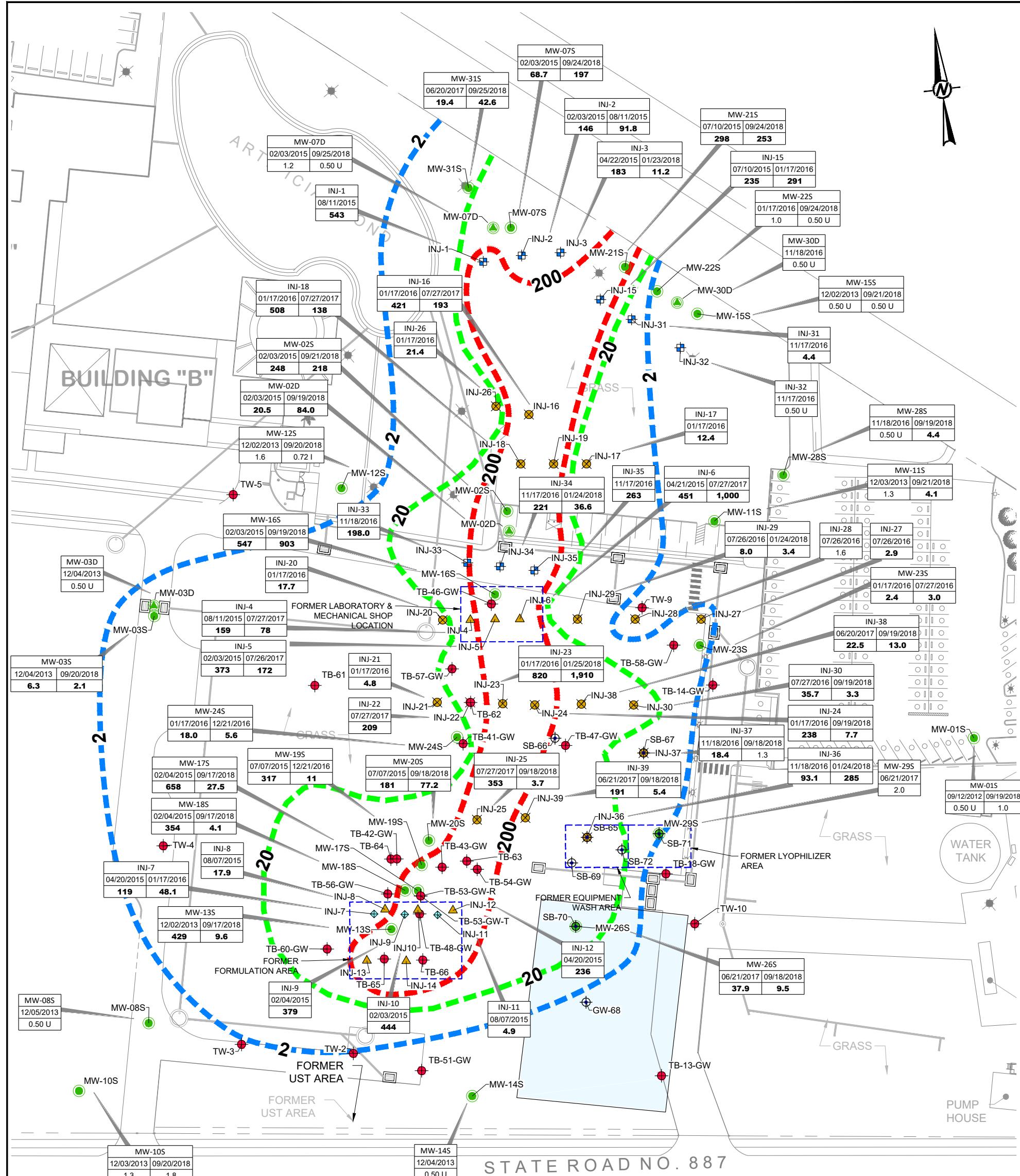
LEGEND				
	SHALLOW MONITORING WELL		INJ-7 1/17/16 5	WELL ID No. DATE SAMPLED PCE IN MICROGRAMS PER LITER (μ g/L)
	DEEP MONITORING WELL			
	BEDROCK INJECTION TREATMENT WELL (SCREEN INTERVAL ~20 TO 40 FEET-BGS)			
	OVERBURDEN INJECTION TREATMENT WELL (SCREEN INTERVAL ~40 TO 50 FEET BGS)			
	OVERBURDEN INJECTION TREATMENT WELL (SCREEN INTERVAL ~50 TO 60 FEET BGS)			
	INJECTION TREATMENT WELL LOCATION (OVERBURDEN)			
	TEMPORARY MONITORING WELL		> 5 μ g/L	
	SOIL BORING LOCATION		> 50 μ g/L	POST-INJECT
	OCTOBER 2013 EXCAVATION AREA			

NOTE(S)

1. ALL SITE BUILDINGS WITH THE EXCEPTION OF BUILDINGS A, B, AND F WERE DEMOLISHED IN 2013.
2. U - INDICATES THAT THE COMPOUND WAS ANALYZED FOR BUT NOT DETECTED
3. I - REPORTED VALUE IS BETWEEN THE LABORATORY METHOD DETECTION LIMIT AND LABORATORY PRACTICAL QUANTITATION LIMIT

REFERENCE(S)

CLIENT Pfizer	PROJECT Pfizer-CAROLINA															
CONSULTANT  GOLDER	<p>TITLE GROUNDWATER ANALYTICAL SUMMARY FOR PCE (w/ POST-INJECTION ISOCONTOURS) (SEPTEMBER 2018) </p> <table> <tr> <td>DATE</td> <td>2019-03-13</td> <td>REV.</td> </tr> <tr> <td>DESIGNED</td> <td>MCC</td> <td>Control No.</td> </tr> <tr> <td>PREPARED</td> <td>BCL</td> <td>10382746-ZS001e</td> </tr> <tr> <td>REVIEWED</td> <td>MCC</td> <td></td> </tr> <tr> <td>APPROVED</td> <td>JP</td> <td></td> </tr> </table>	DATE	2019-03-13	REV.	DESIGNED	MCC	Control No.	PREPARED	BCL	10382746-ZS001e	REVIEWED	MCC		APPROVED	JP	
DATE	2019-03-13	REV.														
DESIGNED	MCC	Control No.														
PREPARED	BCL	10382746-ZS001e														
REVIEWED	MCC															
APPROVED	JP															



ATTACHMENT A

Restrictive Covenant for the Site

-----**DEED OF ESTABLISHMENT OF EQUITABLE SERVITUDE** -----

---In the City San Juan, Commonwealth of Puerto Rico,
this _____ (_____) day of ____, Two Thousand
Eighteen (2018). -----

-----**BEFORE ME** -----

_____, Attorney-at-Law and Notary Public
in and for the Commonwealth of Puerto Rico with office
and residence in _____, Puerto Rico. -----

-----**APPEARS** -----

---**AS PARTY OF THE SOLE PART: PFIZER PHARMACEUTICALS LLC**, Federal Employer Identification Number 66-0577291,
a limited liability company duly organized and validly
existing under the laws of the State of Delaware and
duly authorized to do business in the Commonwealth of
Puerto Rico (hereinafter referred to as the "GRANTOR"),
represented herein by its _____, _____,
of legal age, _____, executive and resident of
_____, Puerto Rico, who is duly authorized to
appear herein per _____. ---

---I, the Notary, do hereby certify and give faith that
I personally know the person who appears herein and I
further certify through his statements as to his age,
civil status, profession and residence. He assures me
that he has, and in my judgment he does have, the
necessary legal capacity to execute this instrument,
and therefore he freely and of his own will and accord

-----**STATES** -----

---**FIRST:** GRANTOR is the owner in fee simple of the
property described as follows (hereinafter referred to
as the "Property"): -----

---"RURAL: Parcel of land located at the Municipality
of Carolina, Puerto Rico, comprising twenty point two
thousand six hundred seven (20.2607) cuerdas, equal to
seventy nine thousand six hundred thirty two point six
thousand seven hundred twenty eight square meters
(79,632.6728 sq. mts.). Bounded on the North with lands
of Enrique Manual, Oriental Group and the Sixty Fifth
(65th) Infantry Regiment Avenue; on the South State
Road Number eight hundred eighty seven (887); on the
East with the Sixty Fifth (65th) Infantry Regiment
Avenue, lands of Empresas Villamil and San Patricio
Hardware, Inc.; on the West with Quiñones Street." ---

---The Property is recorded at folio _____, volume _____ of the Property Registry of Carolina, Puerto Rico. Property Number _____.

---SECOND: GRANTOR acquired title to the Property pursuant to Deed Number _____.

---THIRD: Environmental Contamination at the Property.

The Property has been owned and operated as a pharmaceutical manufacturing facility for approximately sixty-nine (69) years.

Certain portions of the Property are subject to a voluntary Remedial Action Plan to address contamination in ground water and soil, as approved by the United States Environmental Protection Agency and the Puerto Rico Environmental Quality Board.

---FOURTH: Purpose. To assure that the environmental contamination found on the Property does not pose a risk or threat to public health and the environment, GRANTOR (as owner of the Property) hereby agrees to subject the Property to certain use restrictions as follows:

----RESTRICTIONS IMPOSED BY EQUITABLE SERVITUDE -----

---FIFTH: Land Use Limitations. The development and use of the Property shall be subject to the following restrictions and covenants in perpetuity: The development, use and occupancy of the Property shall be restricted to industrial and commercial uses. The Property shall not be developed, occupied or used, in whole or in part, for any type of residential uses, or educational uses such as elementary or secondary schools, or daycare services. The groundwater at, beneath, or flowing from the Property shall not be used for any purpose at all. The Property shall be, and remain at all times, connected to the water system of the Puerto Rico Aqueduct and Sewer System or the municipality in which the Property is located, as applicable.

-----GENERAL PROVISIONS -----

---SIXTH: Deed Binding. This Deed shall be binding in perpetuity upon each owner, lessee and operator while each is an owner, lessee or operator of the Property.

---SEVENTH: Deed Intent and Enforcement. This Deed is not intended to create any interest in real estate in favor of any environmental regulatory agency, but merely is intended to provide notice of certain conditions and restrictions on the Property. The restrictions provided herein will be enforceable by the procedures in law or in equity applicable under the laws of the Commonwealth of Puerto Rico, and will be enforceable against any person or entity which may violate such restrictions. The restrictions set forth herein shall be the basis for presenting and/or requesting before courts with jurisdiction and/or pertinent government agencies, injunctive relief to prevent activities on the Property as prohibited under PARAGRAPH FIFTH herein. -----

---EIGHT: Deed Recording. GRANTOR agrees to execute and deliver whatever instruments or documents as shall be reasonably required or requested and perform whatever actions may be necessary to cause the recording of this Deed in the appropriate Section of the Property Registry. -----

--- NINTH: Separability. If any provision included in this Deed is declared null and void, illegal or unconstitutional by judgment of a court, such declaration or judgment shall not affect the other provisions of this Deed, which shall remain in full force and effect, as each one is considered separate.

----- ACCEPTANCE -----

---**I, THE NOTARY,** do hereby CERTIFY and ATTEST that the appearing party: (a) was advised of the legal effects of this Deed; (b) read and accepted this Deed in all its parts as drafted in accordance with his instructions, stipulations, terms and conditions; (c)

acknowledges that he fully understands the English and Spanish used herein; (d) waived the right to have attesting witnesses; (e) placed his initials on each and every page of this Deed; and (f) signed before me on the last page of this Deed in one act. -----

---I, the undersigned Notary Public, having made to the appearing party all necessary legal admonitions and warnings pertinent to this Deed, hereby CERTIFY AND GIVE FAITH, as to all matters contained herein, under my signature, seal and scroll. -----

ATTACHMENT B

Sampling Data Set

ATTACHMENT B-1
SOIL DATASET

Pfizer, Inc.
Carolina, Puerto Rico

Sample Number	Sample Depth/ Interval	Sample Date	Chloroform	Tetrachloroethene (PCE)	Trichloroethene (TCE)	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl chloride	Petroleum Range Organics
TB-2	15	9/22/2010		0.0028 U	0.0032 U	0.0028 U	0.0034 U	0.0030 U	28.6
TB-3	4	9/22/2010		0.0027 U	0.0031 U	0.0027 U	0.0033 U	0.0030 U	4.9 U
TB-4	2	9/20/2010		0.0030 U	0.0034 U	0.0030 U	0.0037 U	0.0032 U	NA
TB-5	24	9/21/2010		0.0029 U	0.0033 U	0.0029 U	0.0036 U	0.0032 U	NA
TB-6	4	9/22/2010		0.0033 U	0.0037 U	0.0033 U	0.0041 U	0.0036 U	NA
TB-7	22	9/23/2010		0.0027 U	0.0031 U	0.0027 U	0.0033 U	0.0029 U	NA
TB-8	12	9/23/2010		0.0031 U	0.0035 U	0.0031 U	0.0038 U	0.0034 U	NA
TB-9	4	9/21/2010		0.0030 U	0.0034 U	0.0030 U	0.0037 U	0.0032 U	NA
TB-10	4	9/23/2010		0.0029 U	0.0033 U	0.0029 U	0.0035 U	0.0031 U	25.0 U
TB-11	2	9/23/2010		0.0028 U	0.0031 U	0.0028 U	0.0034 U	0.0030 U	4.9 U
TB-12	5 - 6	9/23/2010		0.0032 U	0.0036 U	0.0032 U	0.0039 U	0.0035 U	5.5 U
TB-14	2 - 4	1/17/2011		0.0028 U	0.0031 U	0.0028 U	0.0034 U	0.0030 U	NA
TB-16	1 - 2	6/12/2013	0.0028 U	0.0024 U	0.0027 U	0.0024 U	0.0029 U	0.0026 U	NA
TB-18	2 - 3	6/13/2013	0.0033 U	0.0027 U	0.0918	0.0027 U	0.0034 U	0.0030 U	NA
TB-22	4 - 5	6/13/2013	0.0049 U	0.0041 U	0.0046 U	0.0041 U	0.0050 U	0.0044 U	NA
TB-33	3 - 5	7/16/2013	0.0041 U	0.0035 U	0.0039 U	0.0035 U	0.0043 U	0.0038 U	935
TB-41	20 - 22	7/17/2013	0.0037 U	0.0031 U	0.0222	0.0691	0.0038 U	0.0038 I	NA
TB-43	32 - 34	7/22/2013	0.0030 U	0.0025 U	0.575	0.555	0.0043 I	0.0454	NA
TB-48	24 - 26	7/24/2013	0.0031 U	0.0026 U	0.0032 I	0.0026 U	0.0032 U	0.0068	NA
TB-49	22 - 24	7/24/2013	0.0028 U	0.0024 U	0.0027 U	0.0034 I	0.0029 U	0.0026 U	NA
TB-50	22 - 24	7/24/2013	0.0024 U	0.0021 U	0.0023 U	0.0021 U	0.0025 U	0.0022 U	NA
TB-51	18 - 20	10/22/2013	0.0034 U	0.0029 U	0.0033 U	0.0029 U	0.0036 U	0.0031 U	NA
TB-52	20 - 22	10/23/2013	0.0035 U	0.0030 U	1.15	0.0311	0.0037 U	0.0032 U	NA
TB-52	22 - 24	10/23/2013	0.0045 I	0.0031 U	6.27	0.172	0.0038 U	0.0131	NA
TB-52	24 - 26	10/23/2013	0.0035	0.0029 U	1.63	0.0878	0.0036 U	0.0035 I	NA
TB-53	23	10/23/2013	0.0034 U	0.0029 U	0.0032 U	0.0029 U	0.0035 U	0.0031 U	NA
TB-53	24	10/23/2013	0.0032 U	0.0027 U	0.0031 U	0.0027 U	0.0033 U	0.0029 U	NA
TB-54	23	10/24/2013	0.0029 U	0.0053	0.005	0.007	0.0030 U	0.0062	NA
TB-59	23	10/29/2013	0.0046 U	0.0038 U	0.0043 U	0.0038 U	0.0047 U	0.0041 U	NA
TB-59-GW	35 - 40	10/29/2013		0.0116 U	0.0131 U	0.0116 U	0.0142 U	0.0125 U	NA

ATTACHMENT B-1
SOIL DATASET

Pfizer, Inc.
Carolina, Puerto Rico

Sample Number	Sample Depth/ Interval	Sample Date	Chloroform	Tetrachloroethene (PCE)	Trichloroethene (TCE)	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl chloride	Petroleum Range Organics
TB-61	24	12/8/2013		0.0013 U	0.0014 U	0.0013 U	0.0016 U	0.0014 U	NA
MW-13S-5	5	11/4/2013	0.0035 U	0.0029 U	0.0033 U	0.0029 U	0.0036 U	0.0032 U	NA
SB-65	20 - 22	11/7/2016		0.0022 U	0.279	0.145	0.0041 I	0.0024 U	NA
SB-65	24 - 26	11/7/2016		0.0027 U	0.0618	0.0063	0.0033 U	0.0029 U	NA
SB-65	32 - 34	11/9/2016		0.0035 U	0.0893	0.0132	0.0043 U	0.0038 U	NA
SB-67	18 - 20	11/9/2016		0.0026 U	0.0030 U	0.0078	0.0032 U	0.0028 U	NA
SB-68	14 - 16	11/9/2016		0.0027 U	0.0030 U	0.0027 U	0.0033 U	0.0029 U	NA
SB-69	20 - 22	4/26/2017		0.0030 U	0.0814	0.0030 U	0.0036 U	0.0032 U	NA
SB-70	12 - 14	4/26/2017		0.0036 U	0.875	0.00613	0.0044 U	0.0038 U	NA
SB-70	22 - 24	4/26/2017		0.0028 I	0.0029 U	0.0025 U	0.0031 U	0.0027 U	NA
SB-72	12 - 14	4/27/2017		0.0030 U	0.0210	0.0030 U	0.0037 U	0.0033 U	NA
SB-72	22 - 24	4/27/2017		0.0024 U	0.0112	0.0024 U	0.0030 U	0.0044 I	NA

Notes:

All analytical results reported as mg/kg (milligrams per kilogram).

U - Indicates the compound was analyzed for but not detected at a concentration greater than the shown MDL.

I - The reported value is between the laboratory MDL and the laboratory practical quantitation limit (PQL).

MDL - Method Detection Limit

NA - constituent not analyzed

Sample depth interval is in feet below ground surface.

ATTACHMENT B-2
SOIL DATASET

Pfizer, Inc.
Carolina, Puerto Rico

Sample			Tetrachloroethene	Trichloroethene	1,1-Dichloroethene	cis-1,2-Dichloroethene	1,2-Dichloroethene (Total)*	Vinyl Chloride	Methane	Ethane	Ethene
Location	Group	Date									
MW-01S	7	02/02/2011	0.5	2.8	1.2	0.50 U	0.50 U	0.50 U	NM	NM	NM
		10/17/2011	0.64 I	3.2	0.80 I	0.50 U	0.50 U	0.50 U	NM	NM	NM
		09/12/2012	0.72 I	2.3	0.50 U	0.50 U	0.50 U	0.50 U	0.12 I	0.20 U	0.037 I
		09/19/2018	1	1.6	0.50 U	0.50 U	0.50 U	1	NM	NM	NM
MW-02S	2	02/02/2011	1.4	1,630	9.9	1,490	1,500	303	NM	NM	NM
		10/18/2011	1.6	1,830	7.9	1,780	1,790	253	NM	NM	NM
		09/11/2012	1.4	1,090	7.7	1,200	1,200	222	410	5.3	4.3
		04/17/2013	1.5	776	9.4	1,280	1,290	130	NM	NM	NM
		12/04/2013	1.3	1,330	7.3	1,390	1,400	329	600	0.87	1.7
		02/03/2015	1.6	1,550	8.3	1,710	1,730	248	NM	NM	NM
		03/16/2015	1.3	1,230	7.4	1,370	1,380	186	200	5.0	2.8
		04/21/2015	1.6	1,260	9.3	1,440	1,450	157	150	3.9	2.3
		07/17/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/24/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		08/07/2015	1.4	1,560	8.3	1,640	1,660	257	NM	NM	NM
		01/17/2016	0.50 U	278	1.9	381	393	19.3	NM	NM	NM
		04/18/2016	0.56 I	661	5.0	1,080	1,110	354	NM	NM	NM
		07/26/2016	50.0 U	1,350	50.0 U	1,420	1,550	318	NM	NM	NM
		12/21/2016	0.50 U	353	4.1	621	770	193	NM	NM	NM
		06/20/2017	0.50 U	106	1.9	494	692	185	NM	NM	NM
		09/21/2018	12.5 U	15.0 I	12.5 U	744	928	218	NM	NM	NM
MW-03S	6	02/02/2011	85.4	20	6.9	32.2	32.6	4.3	NM	NM	NM
		10/18/2011	133	34.3	7.5	46.9	47.3	4.1	NM	NM	NM
		09/12/2012	110	30.0	7.5	46.6	46.8	4.2	1.0	0.19 I	0.14 I
		04/17/2013	68	37.9	9.8	54.4	54.9	3.5	NM	NM	NM
		12/04/2013	132	36.8	7.2	45.9	46.2	6.3	0.46	0.16 I	0.045 I
		09/20/2018	89	22.9	3.5	27.2	27.5	2.1	NM	NM	NM
MW-04S	1	02/02/2011	0.50 U	0.50 U	0.5	0.50 U	0.50 U	0.50 U	NM	NM	NM
		10/17/2011	0.50 U	0.50 U	0.58 I	0.50 U	0.50 U	0.50 U	NM	NM	NM
		09/12/2012	0.50 U	0.50 U	0.54 I	0.50 U	0.50 U	0.50 U	9.1	0.010 I	0.027 I

ATTACHMENT B-2
SOIL DATASET

Pfizer, Inc.
Carolina, Puerto Rico

Sample			Tetrachloroethene	Trichloroethene	1,1-Dichloroethene	cis-1,2-Dichloroethene	1,2-Dichloroethene (Total)*	Vinyl Chloride	Methane	Ethane	Ethene
Location	Group	Date									
MW-05S	1	02/02/2011	0.50 U	1.8	1.7	0.5	0.5	0.50 U	NM	NM	NM
		10/17/2011	0.50 U	2.4	0.74 I	0.59 I	0.59 I	0.50 U	NM	NM	NM
		09/12/2012	0.50 U	2.1	1.1	0.74 I	0.74 I	0.50 U	2.6	0.070 I	0.064 I
		12/05/2013	0.50 U	3.7	1.2	0.79 I	0.79 I	0.50 U	1.9	0.018 U	0.022 I
MW-06S	1	02/02/2011	0.50 U	19	7.4	4.1	4.1	0.50 U	NM	NM	NM
		10/18/2011	0.50 U	17.9	5.9	4.4	4.4	0.50 U	NM	NM	NM
		09/11/2012	0.50 U	17.8	5.0	3.5	3.5	0.50 U	3.0	0.017 I	0.052 I
		12/05/2013	0.50 U	26.0	6.3	4.4	4.5	0.50 U	3.3	0.018 U	0.030 I
MW-07S	2	10/17/2011	2.2	538	2.1	324	327	41.6	NM	NM	NM
		09/11/2012	2.1	467	2.7	309	312	77.2	0.20 U	0.20 U	0.20 U
		04/17/2013	3.0	375	4.1	403	408	70.8	NM	NM	NM
		12/03/2013	1.9	703	3.5	494	497	99.2	120	2.0	0.63
		02/03/2015	1.7	666	2.4	509	519	68.7	NM	NM	NM
		03/17/2015	1.5	645	3.6	547	552	92.5	72	1.8	0.62
		04/22/2015	2.0	744	4.5	636	643	100	75	2.2	0.69
		07/17/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/21/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/28/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/31/2015	1.2 U	68.9	6.2	1,536	1,546	1.2 U	NM	NM	NM
		08/11/2015	2.5 U	315	4.7 I	1,210	1,220	116	NM	NM	NM
		01/17/2016	0.50 U	3.1	0.50 U	11.4	25.1	1,060	NM	NM	NM
		04/18/2016	0.50 U	23.6	0.76 I	77.8	84.8	186	NM	NM	NM
		07/26/2016	2.5 U	14.7	2.5 U	248	300	223	5,370	3.8 I	92.7
		12/21/2016	0.50 U	0.50 U	1.5	285	358	193	NM	NM	NM
		06/20/2017	0.50 U	0.66 I	0.50 U	23	34	23	1,330	4.9 U	6.9 I
		01/23/2018	0.50 U	0.50 U	0.59 I	209	275	170	NM	NM	NM
		09/24/2018	0.50 U	0.80 I	0.74 I	301	377	197	NM	NM	NM
MW-08S	5	10/17/2011	25.9	12.1	2.3	10	10	2.1	NM	NM	NM
		09/12/2012	31.4	11.3	2.4	10.7	10.7	0.50 U	0.35	0.059 I	0.086 I
		12/05/2013	10.9	4.3	0.85 I	2.9	2.9	0.50 U	0.48	0.018 U	0.035 I

ATTACHMENT B-2
SOIL DATASET

Pfizer, Inc.
Carolina, Puerto Rico

Sample			Tetrachloroethene	Trichloroethene	1,1-Dichloroethene	cis-1,2-Dichloroethene	1,2-Dichloroethene (Total)*	Vinyl Chloride	Methane	Ethane	Ethene
Location	Group	Date									
MW-09S	1	10/17/2011	0.50 U	14.3	9.2	0.99 l	0.99 l	0.50 U	NM	NM	NM
		09/11/2012	0.50 U	13.7	8.5	0.76 l	0.76 l	0.50 U	0.68	0.20 U	0.050 l
		12/04/2013	0.50 U	13.7	8.1	0.85 l	0.85 l	0.50 U	1.30	0.018 U	0.026 l
		09/20/2018	0.50 U	8.1	4.0	0.86 l	0.97 l	0.50 U	NM	NM	NM
MW-10S	5	12/03/2013	29.7	11.6	2.8	10.8	10.8	1.3	1.0	0.37	0.032 l
		09/20/2018	30.6	14.4	2.8	18.1	18.3	1.8	NM	NM	NM
MW-11S	2	12/03/2013	0.50 U	62.6	0.50 U	8.1	8.8	1.3	8.6	2.00	0.84
		09/21/2018	0.74 l	128	0.94 l	30.0	34.3	4.1	NM	NM	NM
MW-12S	6	12/02/2013	28.3	109	2.9	44.0	44.6	1.6	4.2	0.49	0.53
		09/20/2018	14.5	119	1.3	32.1	32.9	0.72 l	NM	NM	NM
MW-13S	4	12/02/2013	3.5	3,510	12.1	2,610	2,640	429	550	14	13
		12/2/2013 ¹	3.2	2,770	13.9	1,890	1,920	324	540	14	14
		01/03/1900	0.85 l	1,310	5.3	1,630	1,640	134	100	2.0	3.2
		04/20/2015	1.3	1,390	14	3,100	3,140	274	210	5.3	10
		04/19/2016	0.50 U	1.2	0.50 U	2.6	18.4	5.1	NM	NM	NM
		07/25/2016	0.50 U	89.9	6.2	2,040	2,080	553	NM	NM	NM
		12/21/2016	0.50 U	31.1	0.50 U	158	347	74	NM	NM	NM
		06/20/2017	0.50 U	161.0	2.5	256	606	85	NM	NM	NM
		01/25/2018	0.50 U	11.4	0.50 U	76	502	109	NM	NM	NM
		09/17/2018	0.50 U	0.91 l	0.50 U	2	11	10	NM	NM	NM
MW-14S	5	12/04/2013	0.50 U	1.2	0.50 U	0.50 U	0.50 U	0.50 U	12	5.2	0.13 l
MW-15S	2	12/02/2013	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	52	11	2.9
		09/21/2018	0.50 U	1.5	0.50 U	0.50 U	0.50 U	0.50 U	NM	NM	NM

ATTACHMENT B-2
SOIL DATASET

Pfizer, Inc.
Carolina, Puerto Rico

Sample			Tetrachloroethene	Trichloroethene	1,1-Dichloroethene	cis-1,2-Dichloroethene	1,2-Dichloroethene (Total)*	Vinyl Chloride	Methane	Ethane	Ethene
Location	Group	Date									
MW-16S	3	02/03/2015	3.9	4,000	20.3	4,210	4,300	547	1,000	24	14
		03/16/2015	3.5	2,370	16.3	3,180	3,210	397	800	13	8.4
		04/21/2015	3.4	2,630	20	2,980	3,010	383	740	15	8.3
		07/17/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/24/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		08/07/2015	2.8	3,560	18	3,940	4,100	709	NM	NM	NM
		12/04/2015	0.50 U	144	0.50 U	969	1,000	2,570	NM	NM	NM
		01/17/2016	0.50 U	290	3.2	737	791	1,020	NM	NM	NM
		04/19/2016	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/26/2016	0.50 U	58.7	0.57 I	159	307	117	7,410	31.6	62.6
		12/21/2016	0.50 U	21.6	0.50 U	194	378	156	NM	NM	NM
		06/20/2017	0.50 U	33.8	1	360	645	237	2,260	85.6	63.3
MW-17S	4	02/04/2015	1.4	5,930	62.1	9,380	9,530	658	1,200	41	10
		03/16/2015	0.50 U	826	59.4	10,200	10,300	1,080	540	18	5.8
		04/20/2015	0.73 I	2,020	67.7	9,080	9,220	810	920	38	11
		07/08/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/13/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/17/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/24/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		08/07/2015	0.50 U	0.83 I	0.99 I	4.9	85	1,830	NM	NM	NM
		09/11/2015	6.0 U	6.0 U	6.0 U	409	409	26.0	NM	NM	NM
		12/04/2015	0.50 U	0.80 I	0.50 U	4.5	10.6	18.3	NM	NM	NM
		07/27/2016	0.50 U	25.2	0.50 U	7.5	11.1	16.4	2,150	11.4	5.4 I
		12/21/2016	0.50 U	3.4	0.50 U	19.9	35.2	26.6	NM	NM	NM
		06/21/2017	0.50 U	11.0	1.3	300	482	260	NM	NM	NM
		09/17/2018	0.50 U	1.5	0.50 U	13.5	20.2	27.5	NM	NM	NM

ATTACHMENT B-2
SOIL DATASET

Pfizer, Inc.
Carolina, Puerto Rico

Sample			Tetrachloroethene	Trichloroethene	1,1-Dichloroethene	cis-1,2-Dichloroethene	1,2-Dichloroethene (Total)*	Vinyl Chloride	Methane	Ethane	Ethene
Location	Group	Date									
MW-18S	4	02/04/2015	0.68 I	3,190	36.6	5,440	5,530	354	1,200	21	5
		03/16/2015	0.50 U	220	42.6	8,160	8,250	414	960	16	3.9
		04/20/2015	0.50 U	917	45.2	5,340	5,430	449	790	16	5.0
		07/08/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/13/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/17/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/24/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		08/07/2015	0.50 U	0.50 U	0.50 U	2.3	61.9	1,820	NM	NM	NM
		09/11/2015	12.0 U	12.0 U	12.0 U	54.8	86.9	114	NM	NM	NM
		06/20/2017	0.50 U	108	1.8	341	571	773	NM	NM	NM
		01/25/2018	0.50 U	3.2	0.54 I	134	375	343	NM	NM	NM
		09/17/2018	0.50 U	0.50 U	0.50 U	2.0	5.2	4.1	NM	NM	NM
MW-19S	4	07/07/2015	1.2 U	556	12.8	4,502	4,543	317	NM	NM	NM
		07/10/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/13/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/17/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/24/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		08/07/2015	0.50 U	8.8	0.50 U	166	212	486	NM	NM	NM
		09/11/2015	12.0 U	12.0 U	12.0 U	12.0 U	28.4	12.0 U	NM	NM	NM
		04/19/2016	0.50 U	0.50 U	0.50 U	2.4	5.4	5	NM	NM	NM
		12/21/2016	0.50 U	1.8	0.50 U	12.3	22	11	NM	NM	NM
		07/07/2015	1.2 U	532	9.00	2,544	2,568	181	NM	NM	NM
MW-20S	4	07/10/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/13/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/17/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/24/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		08/07/2015	0.50 U	151	4.4	645	670	426	NM	NM	NM
		09/11/2015	12.0 U	12.0 U	12.0 U	12.0 U	35.6	12.0 U	NM	NM	NM
		01/17/2016	0.50 U	113	1.6	193	244	61.3	NM	NM	NM
		04/19/2016	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/27/2016	0.50 U	103	2	159	224	68.8	NM	NM	NM
		09/18/2018	0.50 U	14	1.1	120	203	77.2	NM	NM	NM

ATTACHMENT B-2
SOIL DATASET

Pfizer, Inc.
Carolina, Puerto Rico

Sample			Tetrachloroethene	Trichloroethene	1,1-Dichloroethene	cis-1,2-Dichloroethene	1,2-Dichloroethene (Total)*	Vinyl Chloride	Methane	Ethane	Ethene
Location	Group	Date									
MW-21S	2	07/10/2015	1.2 U	1,649	7.0	3,282	3,292	298	NM	NM	NM
		07/17/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/21/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/28/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/31/2015	1.2 U	1,511	7.0	1,608	1,621	1.2 U	NM	NM	NM
		08/11/2015	2.5 U	1,970	8.2	1,480	1,490	214	NM	NM	NM
		04/18/2016	0.50 U	141	3.9	776	793	816	NM	NM	NM
		07/26/2016	12.5 U	161	12.5 U	1,400	1,460	457	NM	NM	NM
		12/21/2016	0.50 U	119	5.4	858	948	232	NM	NM	NM
		06/20/2017	0.50 U	11	0.63 I	159	205	117	884	13	4.0 I
		01/23/2018	0.50 U	43	2.9	785	938	351	NM	NM	NM
		09/24/2018	0.50 U	8.1	0.98 I	348	460	253	NM	NM	NM
MW-22S	2	01/17/2016	0.50 U	5.9	0.50 U	2.8	3.0	1.0	NM	NM	NM
		09/24/2018	0.50 U	1.3	0.50 U	1.1	1.1	0.50 U	NM	NM	NM
MW-23S	3	01/17/2016	1.2	246	2.5	35.9	40.2	2.4	NM	NM	NM
		07/27/2016	1.3	263	3.8	42.5	48.8	3.0	NM	NM	NM
MW-24S	3	01/17/2016	0.50 U	153	0.50 U	56.5	57	18.0	NM	NM	NM
		04/20/2016	0.50 U	55.6	0.55 I	102	103	7.6	NM	NM	NM
		07/27/2016	0.50 U	145	0.66 I	53.4	53.9	6.3	NM	NM	NM
		12/21/2016	0.50 U	109	0.50 U	36.3	37.0	5.6	NM	NM	NM
MW-26S	8	06/21/2017	17.7	684	1.3	69.1	74.5	37.9	NM	NM	NM
		09/18/2018	0.50 U	0.55 I	0.50 U	2.0	6.1	9.5	NM	NM	NM
MW-27S	8	11/18/2016	8.2	897	4.7	105	115	18	NM	NM	NM
MW-28S	2	11/18/2016	0.50 U	35.2	0.50 U	7.1	7.5	0.50 U	NM	NM	NM
		09/19/2018	0.50 U	72.8	0.74 I	15.4	19.5	4.4	NM	NM	NM
MW-29S	8	06/21/2017	0.50 U	26.0	0.50 U	8.7	9.2	2.0	41.2	4.9 U	0.68 U
MW-31S	2	06/20/2017	0.61 I	119.0	0.50 U	23.2	39.2	19.4	NM	NM	NM
		01/23/2018	0.50 U	6.5	0.50 U	15.7	23.9	26.6	NM	NM	NM
		09/25/2018	0.50 U	7	0.50 U	40.6	51.3	42.6	NM	NM	NM
INJ-1		07/17/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/21/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/28/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
	2	08/11/2015	2.5 U	2.5 U	2.5 U	25.5	47.6	543	NM	NM	NM

ATTACHMENT B-2
SOIL DATASET

Pfizer, Inc.
Carolina, Puerto Rico

Sample			Tetrachloroethene	Trichloroethene	1,1-Dichloroethene	cis-1,2-Dichloroethene	1,2-Dichloroethene (Total)*	Vinyl Chloride	Methane	Ethane	Ethene
Location	Group	Date									
INJ-2	2	02/03/2015	1.4	1,170	4.2	982	1,020	146	NM	NM	NM
		04/21/2015	1.7	1,250	7.4	1,200	1,210	162	900	4.6	1.6
		07/17/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/21/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/28/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/31/2015	1.2 U	2.8	3.0	931	936	1.2 U	NM	NM	NM
		08/11/2015	2.5 U	2.5 U	4.3 I	1,470	1,480	91.8	NM	NM	NM
INJ-3	2	04/22/2015	1.8	1,750	9.3	1,480	1,490	183	590	5.0	1.6
		07/17/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/21/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/28/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		08/11/2015	2.5 U	5.2	10.1	3,540	3,560	206	NM	NM	NM
		07/28/2016	0.50 U	11.2	0.50 U	48	89	160	NM	NM	NM
		01/23/2018	0.50 U	0.50 U	0.50 U	9.5	13.2	11.2	NM	NM	NM
INJ-4	3	07/17/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/21/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/28/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		08/11/2015	2.5 U	1,290	6.6	1,540	1,580	159	NM	NM	NM
		04/19/2016	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/27/2017	0.50 U	7.5	0.50U	169	218	78	NM	NM	NM
		02/03/2015	3.1	2,260	13.8	3,000	3,050	373	NM	NM	NM
INJ-5	3	04/21/2015	1.7	1,210	14.7	2,650	2,690	304	1,400	12	6.7
		07/26/2017	0.50 U	0.61 I	0.50 U	177	363	172	NM	NM	NM
		04/21/2015	3.2	2,210	16.9	3,710	3,750	451	650	25	12
INJ-6	3	04/19/2016	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/27/2017	0.50 U	0.56 I	6.1	1,840	2,340	1,000	NM	NM	NM
		04/20/2015	0.50 U	29.6	1.5	315	331	119	360	1.5	110
INJ-7	4	07/17/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		08/07/2015	0.50 U	0.50 U	0.50 U	2.4	10.6	39.8	NM	NM	NM
		01/17/2016	0.50 U	19.9	0.50 U	27.6	54.1	48.1	NM	NM	NM
		08/07/2015	0.50 U	0.50 U	0.50 U	10.6	19.6	17.9	NM	NM	NM

ATTACHMENT B-2
SOIL DATASET

Pfizer, Inc.
Carolina, Puerto Rico

Sample			Tetrachloroethene	Trichloroethene	1,1-Dichloroethene	cis-1,2-Dichloroethene	1,2-Dichloroethene (Total)*	Vinyl Chloride	Methane	Ethane	Ethene
Location	Group	Date									
INJ-9	4	02/04/2015	0.50 U	1,600	24.4	3,860	3,920	379	NM	NM	NM
		07/13/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/13/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/17/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/24/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		08/07/2015	0.50 U	0.61 I	0.50 U	5.9	34.9	420	NM	NM	NM
		09/11/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
INJ-10	4	02/03/2015	0.50 U	2,020	37.0	4,690	4,780	444	NM	NM	NM
		04/20/2015	0.50 U	634	29.7	4,970	5,510	1,090	820	16	5.7
		07/13/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/17/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/24/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		08/07/2015	0.50 U	0.85 I	0.50 U	14.2	53.3	1,410	NM	NM	NM
INJ-11	4	07/17/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		08/07/2015	0.50 U	1.5	0.50 U	25.2	26.7	4.9	NM	NM	NM
INJ-12	4	04/20/2015	0.50 U	169	15.8	1,250	1,370	236	510	1.1	28
		07/17/2015	NM	NM	NM	NM	NM	NM	NM	NM	NM
		08/07/2015	0.50 U	0.50 U	0.50 U	7.3	59.6	167	NM	NM	NM
INJ-15	2	07/10/2015	1.2 U	1,225	7.50	1,170	1,180	235	NM	NM	NM
		07/31/2015	1.2 U	595	7.3	2,022	2,030	1.2 U	NM	NM	NM
		08/11/2015	2.5 U	3.2 I	12.5	3,630	3,670	220	NM	NM	NM
		01/17/2016	0.50 U	0.54 I	0.50 U	29.9	33.0	291	NM	NM	NM
INJ-16	2	01/17/2016	2.0	1,810	8.2	1,810	1,830	421	NM	NM	NM
		04/18/2016	0.50 U	35.6	0.50 U	203	229	163	NM	NM	NM
		07/27/2017	0.50 U	6.7	2.2	639	829	193	NM	NM	NM
INJ-17	2	01/17/2016	1.1	786	2.0	184	189	12.4	NM	NM	NM
INJ-18	2	01/17/2016	2.1	1,760	10	2,290	2,310	508	NM	NM	NM
		04/19/2016	NM	NM	NM	NM	NM	NM	NM	NM	NM
		07/27/2017	0.50 U	19.4	2.6	669	854	138	NM	NM	NM
INJ-20	3	01/17/2016	0.50 U	391	1.5	222	224	17.7	NM	NM	NM
INJ-21	3	01/17/2016	0.50 U	252	1.0	105	106	4.8	NM	NM	NM
INJ-22	3	07/27/2017	0.50 U	35	3.5	754	1,070	209	NM	NM	NM

ATTACHMENT B-2
SOIL DATASET

Pfizer, Inc.
Carolina, Puerto Rico

Sample			Tetrachloroethene	Trichloroethene	1,1-Dichloroethene	cis-1,2-Dichloroethene	1,2-Dichloroethene (Total)*	Vinyl Chloride	Methane	Ethane	Ethene
Location	Group	Date									
INJ-23	3	01/17/2016	2.0	1,250	12.2	3,150	3,170	820	NM	NM	NM
		01/25/2018	0.50 U	20	5.1	1,200	1,890	1,910	NM	NM	NM
INJ-24	3	01/17/2016	5.9	3,870	9.9	1,610	1,630	238	NM	NM	NM
		04/20/2016	0.50 U	0.50 U	0.50 U	12.8	23.3	8.1	NM	NM	NM
		07/27/2016	0.50 U	22.5	0.50 U	49.9	55.1	18.8	NM	NM	NM
		06/20/2017	0.70 I	1,120	5.4	1,240	1,970	328	NM	NM	NM
		01/25/2018	0.50 U	763	8.2	1,450	2,310	253	NM	NM	NM
		09/19/2018	0.50 U	16	0.50 U	120	152	7.7	NM	NM	NM
INJ-25	4	07/27/2017	0.50 U	217	7.6	942	1,190	353	NM	NM	NM
		09/18/2018	0.50 U	0.50 U	0.50 U	2.2	6.6	3.7	NM	NM	NM
INJ-26	2	01/17/2016	0.67 I	155	1.1	134	135	21.4	NM	NM	NM
INJ-27	3	07/26/2016	0.61 I	237	2.6	33.1	37.2	2.9	NM	NM	NM
INJ-28	3	07/26/2016	0.50 U	191	0.50 U	21.6	22.4	1.6	NM	NM	NM
INJ-29	3	07/26/2016	0.90 I	1,740	1.4	244	249	8.0	NM	NM	NM
		01/24/2018	0.50 U	0.55 I	0.50 U	3.7	5.0	3.4	NM	NM	NM
INJ-30	3	07/27/2016	2.4	2,180	11.3	279	301	36	NM	NM	NM
		01/24/2018	0.80 I	561	3.7	375	388	262	NM	NM	NM
		09/19/2018	0.50 U	5	0.50 U	43	48	3.3	NM	NM	NM
INJ-31	2	11/17/2016	0.50 U	146	0.86 I	49.4	51.3	4.4	NM	NM	NM
INJ-32	2	11/17/2016	0.50 U	2.7	0.50 U	1.4	1.4	0.50 U	NM	NM	NM
INJ-33	3	11/18/2016	0.50 U	928	6.6	1,170	1,260	198	NM	NM	NM
INJ-34	3	11/17/2016	0.50 U	1,180	5.5	1,280	1,360	221	NM	NM	NM
		07/26/2017	0.50 U	44	0.89 I	82	85	11	NM	NM	NM
		01/24/2018	0.50 U	32.6	0.85 I	162.0	167.0	36.6	NM	NM	NM
INJ-35	3	11/17/2016	0.53 I	769	3.7	1,170	1,340	263	NM	NM	NM
INJ-36 (MW-25S)	8	11/18/2016	15.5	4,770	3.6	547	567	93.1	NM	NM	NM
		06/20/2017	0.50 U	147	2.8	1,010	1,020	198.0	NM	NM	NM
		01/24/2018	0.50 U	6	0.50 U	13	27	285	NM	NM	NM
INJ-37	3	11/18/2016	8.2	897	4.7	105	115	18.4	NM	NM	NM
		09/18/2018	0.50 U	3	0.50 U	32	35	1.3	NM	NM	NM
INJ-38	3	06/20/2017	3.2	3,440	2.8	390	406	22.5	NM	NM	NM
		09/19/2018	0.50 U	0.60 I	0.50 U	3.1	8.1	13.0	NM	NM	NM

ATTACHMENT B-2
SOIL DATASET

Pfizer, Inc.
Carolina, Puerto Rico

Sample			Tetrachloroethene	Trichloroethene	1,1-Dichloroethene	cis-1,2-Dichloroethene	1,2-Dichloroethene (Total)*	Vinyl Chloride	Methane	Ethane	Ethene
Location	Group	Date									
INJ-39	4	06/21/2017	1.2	1,180	18.3	1,140	1,160	191	505	7.2 I	2.1 I
		09/18/2018	0.50 U	0.50 U	0.50 U	1.7	19	5.4	NM	NM	NM

Notes:

All analytical results reported in micrograms per liter ($\mu\text{g/L}$).

U - Indicates the compound was analyzed for but not detected at a concentration greater than the shown MDL.

I - The reported value is between the laboratory MDL and the laboratory practical quantitation limit (PQL).

MDL - Method Detection Limit

NM - Not Measured

¹Duplicate sample

*Total 1,2-Dichloroethene is for the *cis* and *trans* isomers.

The Federal MCL of 70 micrograms per liter is for the *cis* isomer as it is the more stringent value.

ATTACHMENT C

Depth to Groundwater Evaluation

ATTACHMENT C-1
DEPTH TO GROUNDWATER EVALUATION

Pfizer, Inc.
Carolina, Puerto Rico

Well Designation	MW-01S	MW-02S	MW-03S	MW-04S	MW-05S	MW-06S	MW-07S
Date	Depth to Water (ft)						
2/2/2011	20.98	19.79	13.30	4.61	1.41	6.81	NI
10/17/2011	19.03	19.13	12.69	3.55	1.34	6.65	15.38
9/12/2012	20.41	19.99	13.21	3.85	1.39	6.58	16.14
4/17/2013	NM	20.84	14.45	NM	NM	NM	16.83
12/6/2013	NM	17.96	11.87	NM	0.40	5.62	14.15
2/3/2015	NM	19.75	13.23	NM	1.45	6.69	15.96
3/17/2015	NM	20.50	NM	NM	NM	NM	16.66
4/20/2015	NM	21.60	NM	NM	NM	NM	17.55
7/8/2015	NM	21.97	15.36	5.62	2.95	8.25	18.02
7/20/2016	21.63	20.34	13.91	3.10	1.28	7.17	16.60
6/19/2017	NM	20.23	NM	NM	NM	NM	16.45
Minimum	19.03	17.96	11.87	3.10	0.40	5.62	14.15
Maximum	21.63	21.97	15.36	5.62	2.95	8.25	18.02
Average	20.51	20.19	13.50	4.15	1.46	6.82	16.37
Well Designation	MW-08S	MW-09S	MW-10S	MW-11S	MW-12S	MW-13S	MW-14S
Date	Depth to Water (ft)						
2/2/2011	NI						
10/17/2011	16.38	4.70	NI	NI	NI	NI	NI
9/12/2012	16.86	4.99	NI	NI	NI	NI	NI
4/17/2013	NM	NM	NI	NI	NI	NI	NI
12/6/2013	15.52	3.97	17.04	18.33	9.93	20.93	16.85
2/3/2015	16.91	4.88	18.54	20.28	11.39	22.30	18.11
3/17/2015	NM	NM	NM	NM	NM	23.32	NM
4/20/2015	NM	NM	NM	NM	NM	23.00	NM
7/8/2015	19.10	6.43	20.75	22.62	13.74	24.71	21.24
7/20/2016	17.56	5.20	19.18	20.88	12.18	23.03	20.10
6/19/2017	NM	NM	NM	NM	NM	23.00	NM
Minimum	15.52	3.97	17.04	18.33	9.93	20.93	16.85
Maximum	19.10	6.43	20.75	22.62	13.74	24.71	21.24
Average	17.06	5.03	18.88	20.53	11.81	22.90	19.08

ATTACHMENT C-1
DEPTH TO GROUNDWATER EVALUATION

Pfizer, Inc.
Carolina, Puerto Rico

Well Designation	MW-15S	MW-16S	MW-17S	MW-18S	MW-19S	MW-20S	MW-21S
Date	Depth to Water (ft)						
12/6/2013	16.45	NI	NI	NI	NI	NI	NI
2/3/2015	18.59	19.27	21.94	21.83	NI	NI	NI
3/17/2015	NM	20.23	23.03	22.79	NI	NI	NI
4/20/2015	NM	21.45	23.60	22.80	NI	NI	NI
7/8/2015	20.68	21.58	24.36	24.23	24.46	24.36	19.97
7/20/2016	19.17	19.88	24.65	23.12	22.81	22.69	18.47
6/19/2017	NM	22	22.00	22.20	NM	NM	18.45
Minimum	16.45	19.27	21.94	21.83	22.81	22.69	18.45
Maximum	20.68	22	24.65	24.23	24.46	24.36	19.97
Average	18.72	20.74	23.26	22.83	23.64	23.53	18.96
Well Designation	MW-22S	MW-23S	MW-24S				
Date	Depth to Water (ft)	Depth to Water (ft)	Depth to Water (ft)				
7/20/2016	18.78	18.72	23.68				
Average	18.78	18.72	23.68				
Well Designation	MW-25S	MW-26S	MW-27S	MW-28S	MW-29S	MW-31S	
Date	Depth to Water (ft)						
11/17/2016	18.17	NM	17.9	21.57	NM	NM	
6/20/2017	NM	20.2	NM	NM	19.55	15.03	
Average	18.17	20.2	17.9	21.57	19.55	15.03	
Well Designation	INJ-1	INJ-2	INJ-3	INJ-4	INJ-5	INJ-6	INJ-7
Date	Depth to Water (ft)						
2/3/2015	NM	16.76	NM	NM	19.65	NM	NM
7/8/2015	17.17	18.85	19.23	21.94	21.96	22.54	24.46
7/20/2016	16.21	17.87	18.38	19.93	20.18	21.80	23.00
Well Designation	INJ-8	INJ-9	INJ-10	INJ-11	INJ-12	INJ-13	INJ-14
Date	Depth to Water (ft)						
7/8/2015	24.51	24.42	24.41	21.82	22.75	24.50	24.35
7/20/2016	22.84	23.1	23.82	20.10	20.82	22.65	22.53

ATTACHMENT C-1
DEPTH TO GROUNDWATER EVALUATION

Pfizer, Inc.
Carolina, Puerto Rico

Well Designation	INJ-15	INJ-16	INJ-17	INJ-18	INJ-19	INJ-20	INJ-21
Date	Depth to Water (ft)						
7/8/2015	19.9	NI	NI	NI	NI	NI	NI
7/20/2016	18.46	20.27	21.02	21.05	21.04	20.54	22.68
Well Designation	INJ-22	INJ-23	INJ-24	INJ-25	INJ-26	INJ-27	INJ-28
Date	Depth to Water (ft)						
7/20/2016	22.51	22.41	22.33	21.41	21.31	18.81	21.38
6/19/2017	NM	NM	22.20	NM	NM	NM	NM
Well Designation	INJ-29	INJ-30	INJ-33	INJ-34	INJ-35	INJ-36	INJ-37
Date	Depth to Water (ft)						
7/20/2016	21.25	21.64	NM	NM	NM	NM	NM
6/20/2017	NM	NM	NM	NM	NM	20.10	NM
Well Designation	INJ-38	INJ-39					
Date	Depth to Water (ft)	Depth to Water (ft)					
6/19/2017	22.10	20.14					

Notes:
 ft - feet
 NI - not indicated
 NM - not measured

ATTACHMENT C-2
DEPTH TO GROUNDWATER EVALUATION

Pfizer, Inc.
Carolina, Puerto Rico

Group	Sample	Depth to Groundwater (ft)	USCS Soil Classification
1	MW-04S	4.1	silt
	MW-05S	1.5	
	MW-06S	6.8	
	MW-09S	5.0	
	Shallowest	1.5	
2	MW-02S	20.2	silt, clay
	MW-07S	16.4	
	MW-11S	20.5	
	MW-15S	18.7	
	MW-21S	19.0	
	MW-22S	18.8	
	MW-28S	21.6	
	MW-31S	15.0	
	Shallowest	15.0	
3	MW-16S	20.5	clay, clayey sand
	MW-23S	18.7	
	MW-24S	23.7	
	Shallowest	18.7	
4	MW-13S	22.9	silt
	MW-17S	23.3	
	MW-18S	22.8	
	MW-19S	23.6	
	MW-20S	23.5	
	Shallowest	22.8	
5	MW-08S	17.1	silt
	MW-10S	18.9	
	MW-14S	19.1	
	Shallowest	17.1	
6	MW-03S	13.5	clay, clayey sand
	MW-12S	11.8	
	Shallowest	11.8	
7	MW-01S	20.5	clay, clayey sand
	Shallowest	20.5	
8	MW-25S	18.2	silt
	MW-26S	20.2	
	MW-27S	17.9	
	MW-29S	19.6	
	Shallowest	17.9	

ATTACHMENT D

Soil Classification Results

Pfizer/RAP Implementation/PR Summary of Soil Data

ABBREVIATIONS: LIQUID LIMIT (LL)
PLASTIC LIMIT (PL)
PLASTICITY INDEX (PI)
LIQUIDITY INDEX (LI)
SPECIFIC GRAVITY (Gs)
MOISTURE (Mc)

NOTES: T = TRIAXIAL TEST
U = UNCONFINED COMPRESSION TEST
C = CONSOLIDATION TEST
DS = DIRECT SHEAR TEST
O = ORGANIC CONTENT
P = pH

APRIL 2018

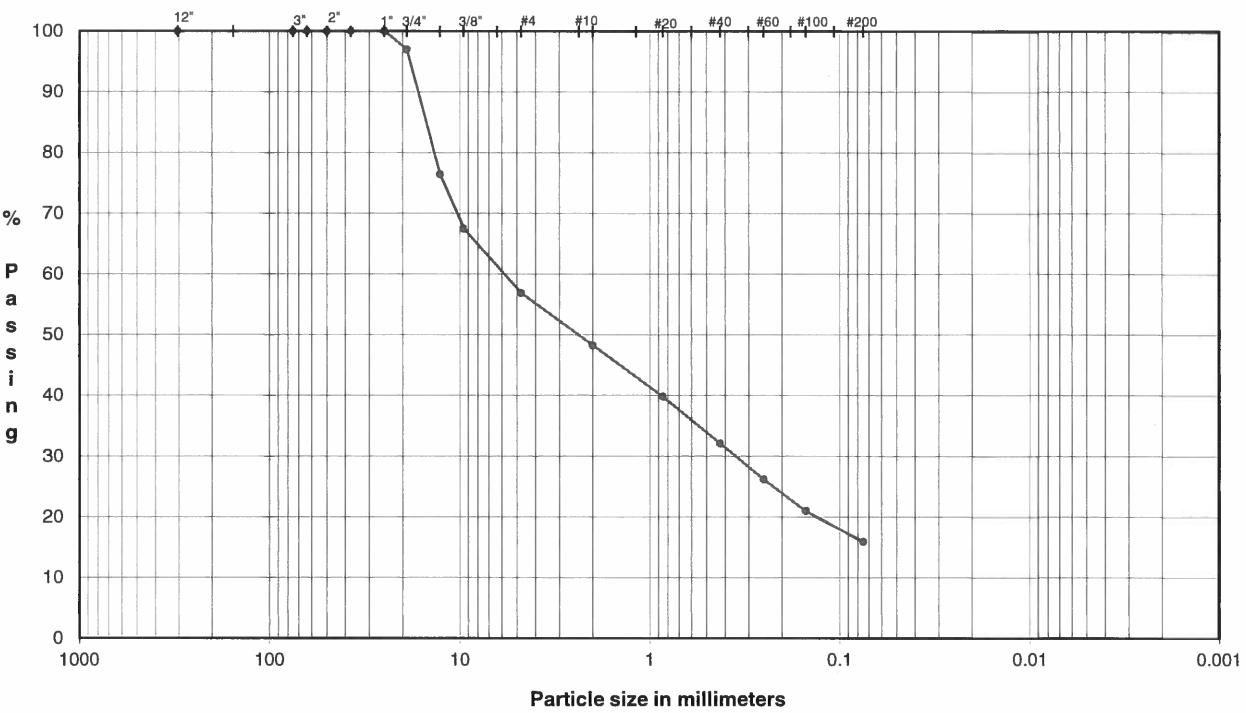
103-82746-B

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D6913, D4318

PROJECT NAME: PFIZER/RAP IMPLEMENTATION/PR
 SAMPLE ID: JE-1
 TYPE: Bag

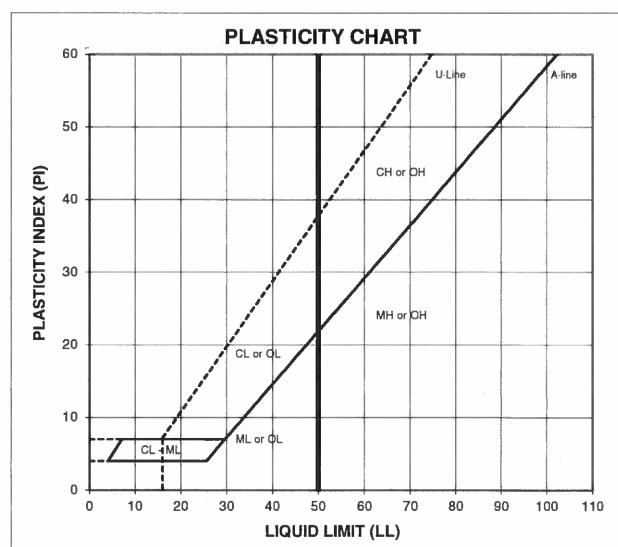
Depth: 4.0-5.0'



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	COBBLES	GRAVEL			SAND	FINES

U.S. Standard Sieve Sizes and Numbers

Particle Size (mm)	% Passing	Classification	Percentage
12.0"	304.8	100.0	
3.0"	75.0	100.0	
2.5"	63.5	100.0	
2.0"	50.0	100.0	
1.5"	37.5	100.0	
1.0"	25.0	100.0	
0.75"	19.0	97.0	
0.50"	12.7	76.4	
0.375"	9.5	67.4	
#4	4.8	56.9	
#10	2.00	48.3	
#20	0.85	39.8	
#40	0.43	32.1	
#60	0.25	26.1	
#100	0.15	21.0	
#200	0.075	15.9	
		Fines	15.9



DESCRIPTION: SITLY GRAVEL and SAND, fine to coarse gravel, fine to coarse sand; yellowish brown.

USCS: GM

NOTE: Insufficient sample received to perform in accordance with ASTM Standards

M _c	LL	PL	PI	LI
14.8	NP	NP	NP	NP

LL (oven-dried)
 < 0.75 = ORGANIC
 (OL/OH)

TECH	TJ/DA
DATE	4/27/18
CHECK	<i>[Signature]</i>
REVIEW	<i>[Signature]</i>
APPROVE	<i>[Signature]</i>

APRIL 2018

103-82746-B

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

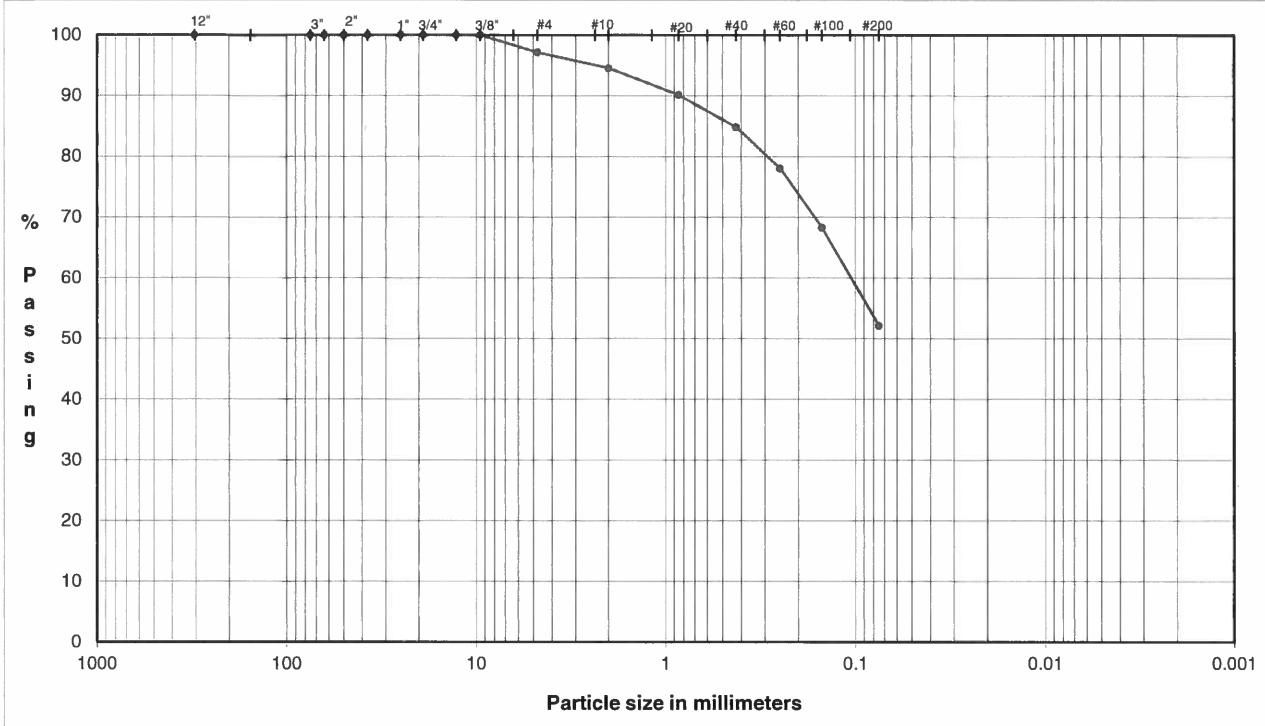
ASTM D6913, D4318

PROJECT NAME: PFIZER/RAP IMPLEMENTATION/PR

SAMPLE ID: JE-1

Depth: 8.0-9.0'

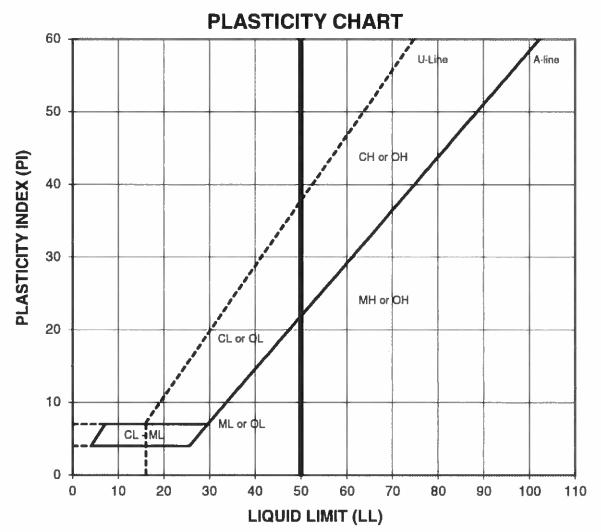
TYPE: Bag



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	COBBLES	GRAVEL	SAND			FINES

U.S. Standard Sieves Sizes and Numbers

Particle Size (mm)	% Passing	Classification	Percentage
12.0"	304.8	100.0	
3.0"	75.0	100.0	
2.5"	63.5	100.0	
2.0"	50.0	100.0	
1.5"	37.5	100.0	
1.0"	25.0	100.0	
0.75"	19.0	100.0	
0.50"	12.7	100.0	
0.375"	9.5	100.0	
#4	4.8	97.1	
#10	2.00	94.5	
#20	0.85	90.1	
#40	0.43	84.8	
#60	0.25	78.0	
#100	0.15	68.3	
#200	0.075	52.1	
		Fines	52.1



DESCRIPTION: SILT and SAND, fine to coarse, trace fine gravel; yellowish brown and olive gray.

USCS: ML

M _c	LL	PL	PI	LI
14.8	NP	NP	NP	NP

LL (oven-dried)
<0.75 = ORGANIC
(OL/OH)

TECH	TJ/HEH
DATE	4/27/18
CHECK	<i>[Signature]</i>
REVIEW	<i>[Signature]</i>
APPROVE	<i>[Signature]</i>

APRIL 2018

103-82746-B

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

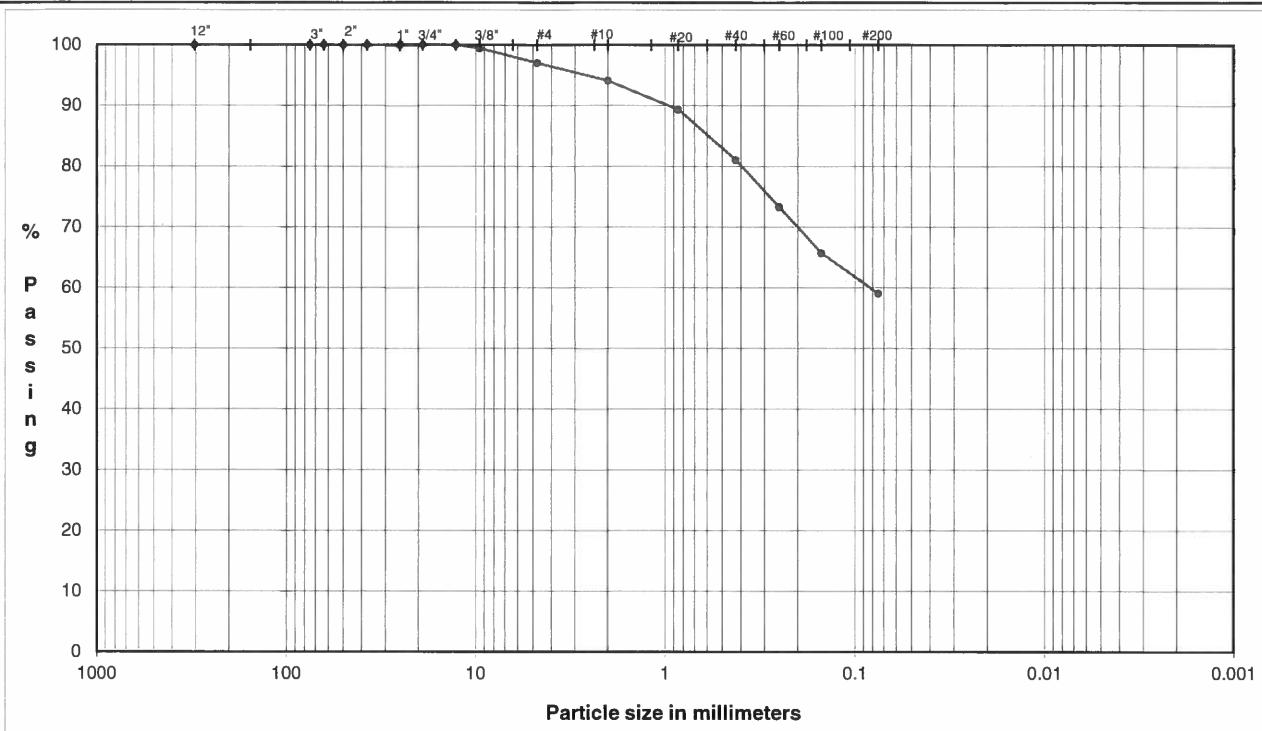
ASTM D6913, D4318

PROJECT NAME: PFIZER/RAP IMPLEMENTATION/PR

SAMPLE ID: JE-2

Depth: 4.0-5.0'

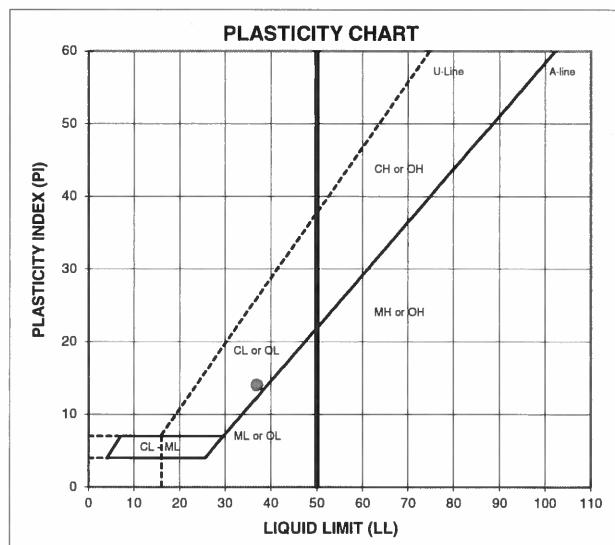
TYPE: Bag



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	COBBLES	GRAVEL			SAND	FINES

U.S. Standard Sieve Sizes and Numbers

Particle Size (mm)	% Passing	Classification	Percentage
12.0"	304.8	100.0	
3.0"	75.0	100.0	
2.5"	63.5	100.0	
2.0"	50.0	100.0	
1.5"	37.5	100.0	
1.0"	25.0	100.0	
0.75"	19.0	100.0	
0.50"	12.7	100.0	
0.375"	9.5	99.4	
#4	4.8	97.0	
#10	2.00	94.1	2.9
#20	0.85	89.3	
#40	0.43	81.0	13.1
#60	0.25	73.2	
#100	0.15	65.7	
#200	0.075	59.0	22.0
		Fines	59.0



DESCRIPTION: SILTY CLAY and SAND, fine to coarse; yellowish brown and gray.

USCS: CL

ATTERBERG LIMITS
Method -B (Dry preparation)

M _c	LL	PL	PI	LI
25.8	37	23	14	0.23

LL (oven-dried)
< 0.75 = ORGANIC
(OL/OH)

TECH	TJ/DA
DATE	4/27/18
CHECK	<i>[Signature]</i>
REVIEW	<i>[Signature]</i>
APPROVE	<i>[Signature]</i>

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

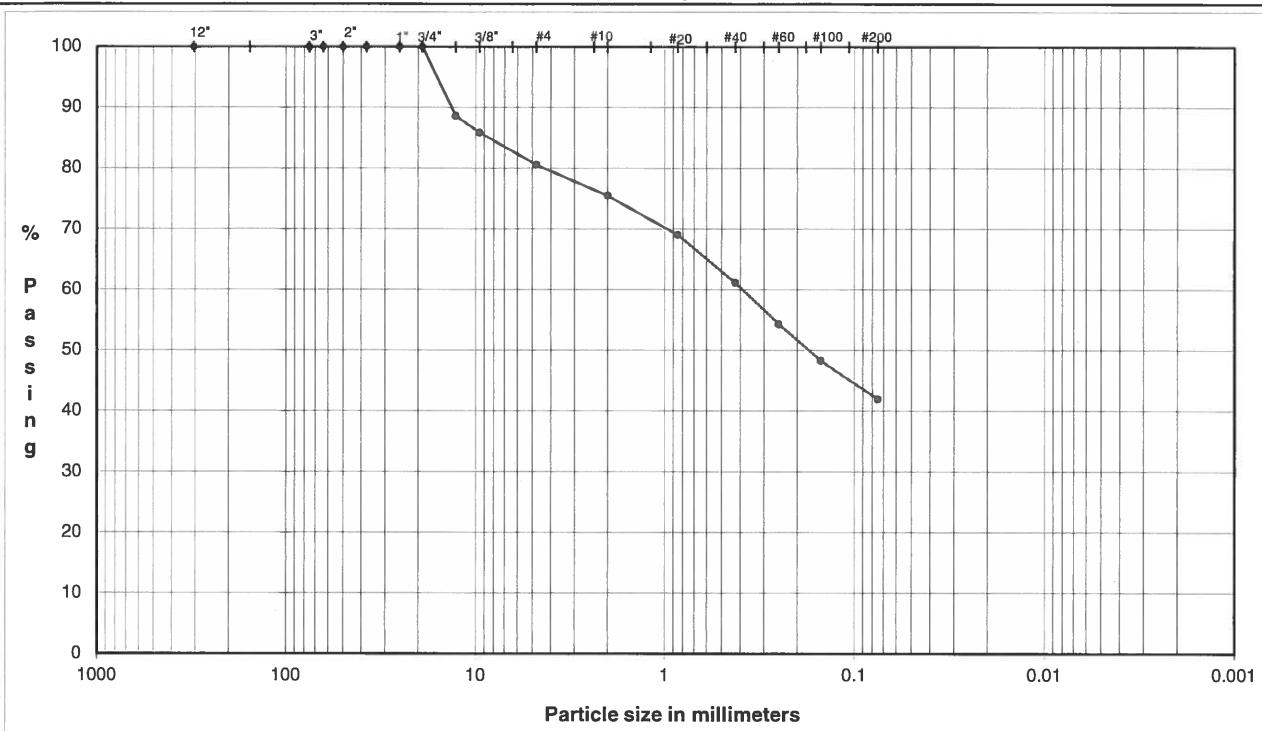
ASTM D6913, D4318

PROJECT NAME: PFIZER/RAP IMPLEMENTATION/PR

SAMPLE ID: JE-2

Depth: 9.0-10.0'

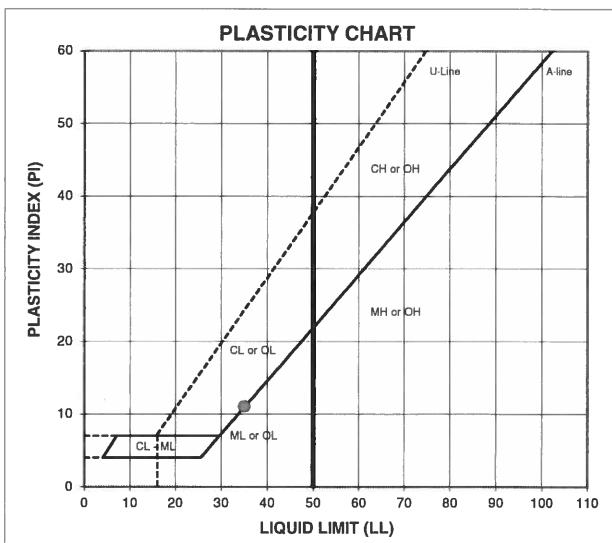
TYPE: Bag



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	COBBLES	GRAVEL			SAND	FINES

U.S. Standard Sieves Sizes and Numbers

Particle Size (mm)	% Passing	Particle Size Classification		Percentage
		Cobbles	Coarse Gravel	
12.0"	304.8	100.0		0.0
3.0"	75.0	100.0		
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0		
0.50"	12.7	88.6		
0.375"	9.5	85.8		
#4	4.8	80.5	Fine Gravel	19.5
#10	2.00	75.5	Coarse Sand	5.1
#20	0.85	69.0		
#40	0.43	61.1	Medium Sand	14.3
#60	0.25	54.3		
#100	0.15	48.3		
#200	0.075	42.0	Fine Sand	19.2
			Fines	42.0



DESCRIPTION: gravelly SAND and SILTY CLAY, fine to coarse, fine gravel; olive gray.

USCS: SC

ATTERBERG LIMITS
Method -B (Dry preparation)

M _c	LL	PL	PI	LI
21.8	35	24	11	-0.21

LL (oven-dried)
<0.75 = ORGANIC
(O/L/OH)

TECH	TJ/DA
DATE	4/27/18
CHECK	<i>[Signature]</i>
REVIEW	<i>[Signature]</i>
APPROVE	<i>[Signature]</i>

APRIL 2018

103-82746-B

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

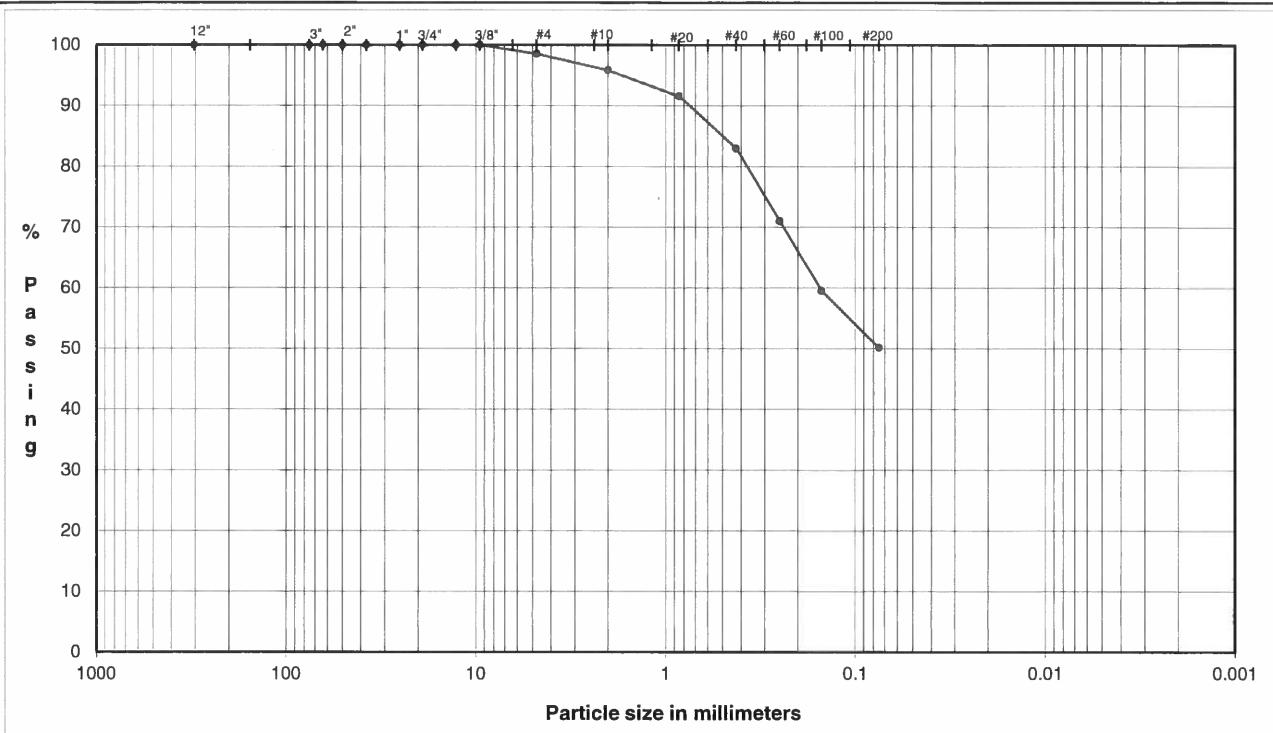
ASTM D6913, D4318

PROJECT NAME: PFIZER/RAP IMPLEMENTATION/PR

SAMPLE ID: JE-3

Depth: 4.0-5.0'

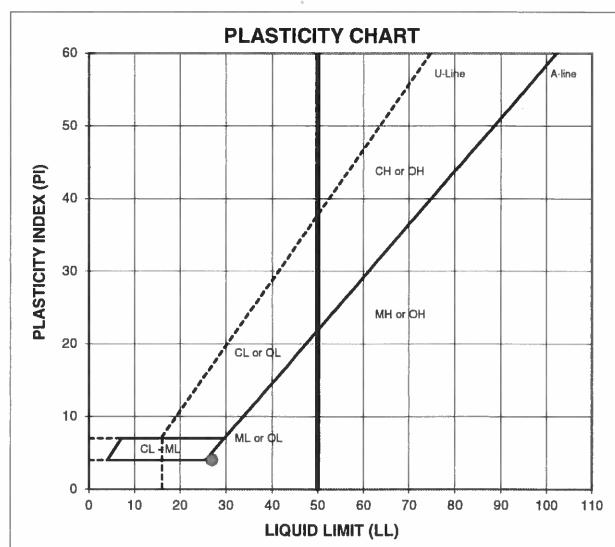
TYPE: Bag



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	COBBLES	GRAVEL			SAND	FINES

U.S. Standard Sieve Sizes and Numbers

Particle Size (mm)	% Passing	Classification	Percentage
12.0"	304.8	100.0	
3.0"	75.0	100.0	
2.5"	63.5	100.0	
2.0"	50.0	100.0	
1.5"	37.5	100.0	
1.0"	25.0	100.0	
0.75"	19.0	100.0	
0.50"	12.7	100.0	
0.375"	9.5	100.0	
#4	4.8	98.5	
#10	2.00	95.8	
#20	0.85	91.6	
#40	0.43	83.0	
#60	0.25	71.0	
#100	0.15	59.5	
#200	0.075	50.1	
Fines			32.8
			50.1



DESCRIPTION: CLAYEY SILT and SAND, fine to coarse, trace fine gravel; yellowish brown.

USCS: ML

M _c	LL	PL	PI	LI
26.4	27	23	4	0.89

LL (oven-dried)
< 0.75 = ORGANIC
(OL/OH)

TECH	TJ/DA
DATE	4/27/18
CHECK	
REVIEW	
APPROVE	MV

APRIL 2018

103-82746-B

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

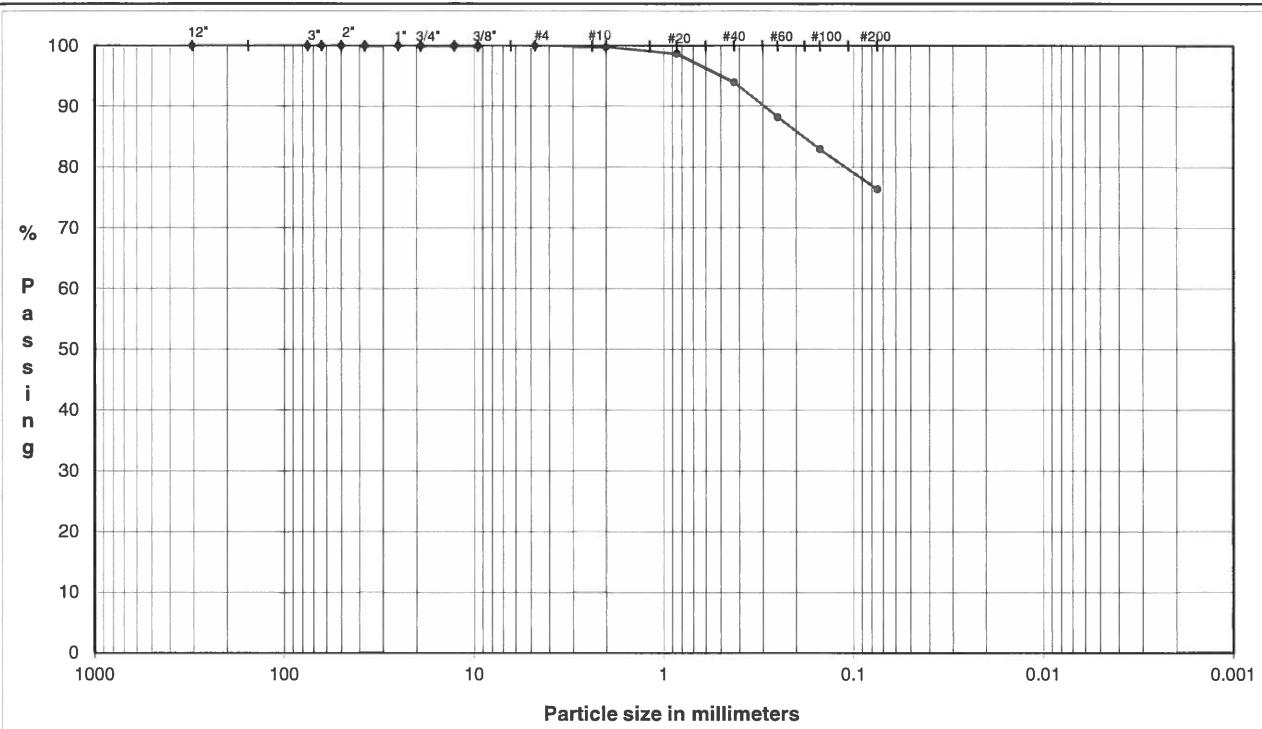
ASTM D6913, D4318

PROJECT NAME: PFIZER/RAP IMPLEMENTATION/PR

SAMPLE ID: JE-3

Depth: 9.0-10.0'

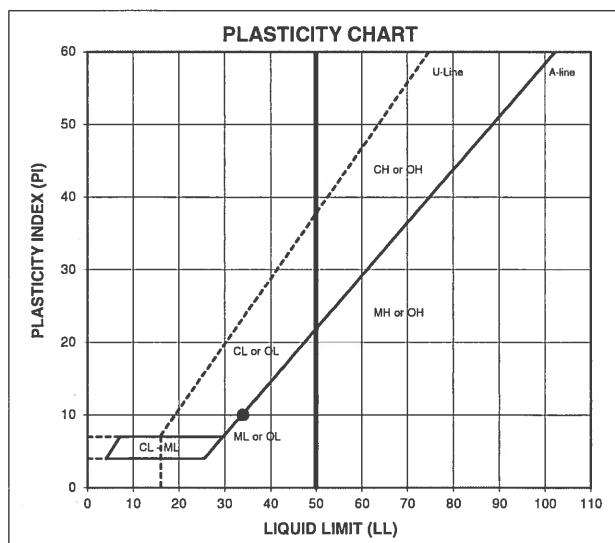
TYPE: Bag



	Coarse	Fine	Course	Medium	Fine	Silt or Clay
COBBLES	GRAVEL			SAND		FINES

U.S. Standard Sieves Sizes and Numbers

Particle Size (mm)	% Passing	Classification	Percentage
12.0"	304.8	100.0	
3.0"	75.0	100.0	
2.5"	63.5	100.0	
2.0"	50.0	100.0	
1.5"	37.5	100.0	
1.0"	25.0	100.0	
0.75"	19.0	100.0	
0.50"	12.7	100.0	
0.375"	9.5	100.0	
#4	4.8	100.0	
#10	2.00	99.8	0.2
#20	0.85	98.6	
#40	0.43	93.9	5.9
#60	0.25	88.2	
#100	0.15	82.9	
#200	0.075	76.3	17.6
		Fines	76.3



DESCRIPTION: sandy SILTY CLAY, fine to coarse; yellowish brown and gray.

USCS: CL

ATTERBERG LIMITS
Method -B (Dry preparation)

M _c	LL	PL	PI	LI
17.0	34	24	10	-0.69

LL (oven-dried)
< 0.75 = ORGANIC
(O/L/OH)

TECH	TJ
DATE	4/27/18
CHECK	<i>[Signature]</i>
REVIEW	<i>[Signature]</i>
APPROVE	<i>[Signature]</i>

ATTACHMENT E

Johnson & Ettinger Models

Model Input**Site Name/Run Number:**

Example, Run 1

Note:

- Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
- Dotted outline cells indicate default values that may be changed with justification.
- Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

[Use English / Metric Converter](#)

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	500		NA			
Depth below grade to water table	(m)	Ls	5.00		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	25	25	3 - 25			
Calc: Source vapor concentration	(ug/m ³)	Cs	361919					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.219%					
Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Tetrachloroethylene					
CAS No.		CAS	127-18-4					
Toxicity Factors								
Unit risk factor	(ug/m ³) ⁻¹	IUR	2.60E-07	2.60E-07	NA	NA		
Mutagenic compound		Mut	No	NA	NA	NA		
Reference concentration	(mg/m ³)	RfC	4.00E-02	4.00E-02	NA	NA		
Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	2.06E+02	2.06E+02	NA	NA		
Henry's Law Constant @ 25°C	(atm·m ³ /mol)	Hc	1.77E-02	1.77E-02	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	7.24E-01	7.24E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	7.24E-01	7.24E-01				
Diffusivity in air	(cm ² /s)	Dair	5.05E-02	5.05E-02	NA	NA		
Diffusivity in water	(cm ² /s)	Dwater	9.46E-06	9.46E-06	NA	NA		
Building Characteristics:								
Select Building Assumptions								
<input checked="" type="radio"/> Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)								
<input type="radio"/> Specify Qsoil and Qbuilding separately; calculate ratio								
	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment

Building setting	Bldg_Setting	Commercial	Commercial		
Foundation type	Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019
Enclosed space floor area	(m ²)	Abf	1500.00	1500.00	80-1000
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05
Indoor air exchange rate	(l / hr)	ach	1.50	1.50	.3-4.1
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05
Calc: Building ventilation rate	(m ³ /hr)	Qb	6750.00	6750.00	NA
Calc: Average vapor flow rate into building	(m ³ /hr)	Qsoil	20.25	20.25	NA

Model Input Site Name/Run Number: Example, Run 1
 Chemical Name: Tetrachloroethylene CAS No. 127-18-4
 Depth below grade to water table: 5.00 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Silt					
Stratum A thickness (from surface)	(m)	hSA	2.50					
Stratum A total porosity	(-)	nSA	0.489	0.489	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.167	0.167	0.05 - 0.28	0.25		
Stratum A bulk density	(g/cm ³)	rhoSA	1.350	1.350	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Clay					
Stratum B thickness	(m)	hSB	2.50					
Stratum B total porosity	(-)	nSB	0.459	0.459	NA	0.20		
Stratum B water-filled porosity	(-)	nwSB	0.215	0.215	0.098 - 0.33	0.25		
Stratum B bulk density	(g/cm ³)	rhoSB	1.430	1.430	NA	0.05		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm ³)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum B					

Height of capillary fringe	(m)	hc _z	0.815	0.815	NA	NA		
Capillary zone total porosity	(-)	nc _z	0.459	0.459	NA	0.20		
Capillary zone water filled porosity	(-)	nwc _z	0.412	0.412	NA	0.24		
Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	AT _c	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	AT _{nc}	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA	NOTE	MMOAF not relevant for non-mutagenic

Model Output	Site Name/Run Number:				Range		
Chemical Name: Tetrachloroethylene	CAS No. 127-18-4				is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.		
Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag
Groundwater to indoor air attenuation coefficient	(-)	alpha	1.2E-06	1.2E-06 - 1.2E-06	1.2E-06	1.2E-06 - 1.2E-06	
Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag
Indoor air concentration due to vapor intrusion	(ug/m ³)	C _{ia}	4.4E-01	4.4E-01 - 4.4E-01	4.4E-01	4.4E-01 - 4.4E-01	
	(ppbv)		6.5E-02	6.4E-02 - 6.5E-02	6.5E-02	6.4E-02 - 6.5E-02	
Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag
Subslab vapor concentration	(ug/m ³) (ppbv)	C _{ss}	1.5E+02 2.2E+01	8.8E+00 - 4.4E+03 1.3E+00 - 6.4E+02	1.5E+02 2.2E+01	4.4E+03 - 4.4E+03 6.4E+02 - 6.5E+02	
Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag
Effective diffusion coefficient through Stratum A	(cm ² /sec)	DeffA	4.8E-03	-	4.8E-03	-	
Effective diffusion coefficient through Stratum B	(cm ² /sec)	DeffB	2.2E-03	-	2.2E-03	-	
Effective diffusion coefficient through Stratum C	(cm ² /sec)	DeffC	-	-	-	-	
Effective diffusion coefficient through capillary zone	(cm ² /sec)	DeffCZ	1.2E-05	-	1.2E-05	-	
Effective diffusion coefficient through unsaturated zone	(cm ² /sec)	DeffT	7.2E-05	-	7.2E-05	-	
Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	1.2E-06	-	1.2E-06		

Model Input**Site Name/Run Number:**

Example, Run 1

Note:

- Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
- Dotted outline cells indicate default values that may be changed with justification.
- Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

[Use English / Metric Converter](#)

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	500		NA			
Depth below grade to water table	(m)	Ls	6.00		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	25	25	3 - 25			
Calc: Source vapor concentration	(ug/m ³)	Cs	361919					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.219%					
Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Tetrachloroethylene					
CAS No.		CAS	127-18-4					
Toxicity Factors								
Unit risk factor	(ug/m ³) ⁻¹	IUR	2.60E-07	2.60E-07	NA	NA		
Mutagenic compound		Mut	No	NA	NA	NA		
Reference concentration	(mg/m ³)	RfC	4.00E-02	4.00E-02	NA	NA		
Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	2.06E+02	2.06E+02	NA	NA		
Henry's Law Constant @ 25°C	(atm·m ³ /mol)	Hc	1.77E-02	1.77E-02	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	7.24E-01	7.24E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	7.24E-01	7.24E-01				
Diffusivity in air	(cm ² /s)	Dair	5.05E-02	5.05E-02	NA	NA		
Diffusivity in water	(cm ² /s)	Dwater	9.46E-06	9.46E-06	NA	NA		
Building Characteristics:								
Select Building Assumptions								
<input checked="" type="radio"/> Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)								
<input type="radio"/> Specify Qsoil and Qbuilding separately; calculate ratio								
	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment

Building setting	Bldg_Setting	Commercial	Commercial		
Foundation type	Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019
Enclosed space floor area	(m ²)	Abf	1500.00	1500.00	80-1000
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05
Indoor air exchange rate	(l / hr)	ach	1.50	1.50	.3-4.1
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05
Calc: Building ventilation rate	(m ³ /hr)	Qb	6750.00	6750.00	NA
Calc: Average vapor flow rate into building	(m ³ /hr)	Qsoil	20.25	20.25	NA

Model Input Site Name/Run Number: Example, Run 1
 Chemical Name: Tetrachloroethylene CAS No. 127-18-4
 Depth below grade to water table: 6.00 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Clay					
Stratum A thickness (from surface)	(m)	hSA	3.00					
Stratum A total porosity	(-)	nSA	0.459	0.459	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.215	0.215	0.098 - 0.33	0.25		
Stratum A bulk density	(g/cm ³)	rhoSA	1.430	1.430	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Sandy Clay					
Stratum B thickness	(m)	hSB	3.00					
Stratum B total porosity	(-)	nSB	0.385	0.385	NA	0.20		
Stratum B water-filled porosity	(-)	nwSB	0.197	0.197	0.117 - 0.28	0.25		
Stratum B bulk density	(g/cm ³)	rhoSB	1.630	1.630	NA	0.05		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm ³)	rhoSC			NA	NA		
Stratum directly above the water table		src_soil	Stratum B					
Stratum A, B, or C								

Height of capillary fringe	(m)	hc _z	0.300	0.300	NA	NA		
Capillary zone total porosity	(-)	nc _z	0.385	0.385	NA	0.20		
Capillary zone water filled porosity	(-)	nwc _z	0.355	0.355	NA	0.13		
Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	AT _c	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	AT _{nc}	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA	NOTE	MMOAF not relevant for non-mutagenic

Model Output	Site Name/Run Number:				Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.		
Chemical Name: Tetrachloroethylene	CAS No. 127-18-4						
Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag
Groundwater to indoor air attenuation coefficient	(-)	alpha	1.5E-06	1.4E-06 - 1.5E-06	1.5E-06	1.4E-06 - 1.5E-06	
Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag
Indoor air concentration due to vapor intrusion	(ug/m ³)	C _{ia}	5.3E-01	5.2E-01 - 5.3E-01	5.3E-01	5.2E-01 - 5.3E-01	
	(ppbv)		7.8E-02	7.7E-02 - 7.8E-02	7.8E-02	7.7E-02 - 7.8E-02	
Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag
Subslab vapor concentration	(ug/m ³) (ppbv)	C _{ss}	1.8E+02 2.6E+01	1.1E+01 - 5.2E+03 1.6E+00 - 7.7E+02	1.8E+02 2.6E+01	5.2E+03 - 5.3E+03 7.7E+02 - 7.8E+02	
Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag
Effective diffusion coefficient through Stratum A	(cm ² /sec)	DeffA	2.2E-03	-	2.2E-03	-	
Effective diffusion coefficient through Stratum B	(cm ² /sec)	DeffB	1.3E-03	-	1.3E-03	-	
Effective diffusion coefficient through Stratum C	(cm ² /sec)	DeffC	-	-	-	-	
Effective diffusion coefficient through capillary zone	(cm ² /sec)	DeffCZ	5.7E-06	-	5.7E-06	-	
Effective diffusion coefficient through unsaturated zone	(cm ² /sec)	DeffT	1.0E-04	-	1.0E-04	-	
Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	1.5E-06	-	1.5E-06		

Model Input**Site Name/Run Number:**

Example, Run 1

Note:

- Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
- Dotted outline cells indicate default values that may be changed with justification.
- Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

[Use English / Metric Converter](#)

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	500		NA			
Depth below grade to water table	(m)	Ls	6.50		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	25	25	3 - 25			
Calc: Source vapor concentration	(ug/m ³)	Cs	361919					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.219%					
Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Tetrachloroethylene					
CAS No.		CAS	127-18-4					
Toxicity Factors								
Unit risk factor	(ug/m ³) ⁻¹	IUR	2.60E-07	2.60E-07	NA	NA		
Mutagenic compound		Mut	No	NA	NA	NA		
Reference concentration	(mg/m ³)	RfC	4.00E-02	4.00E-02	NA	NA		
Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	2.06E+02	2.06E+02	NA	NA		
Henry's Law Constant @ 25°C	(atm·m ³ /mol)	Hc	1.77E-02	1.77E-02	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	7.24E-01	7.24E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	7.24E-01	7.24E-01				
Diffusivity in air	(cm ² /s)	Dair	5.05E-02	5.05E-02	NA	NA		
Diffusivity in water	(cm ² /s)	Dwater	9.46E-06	9.46E-06	NA	NA		
Building Characteristics:								
Select Building Assumptions								
<input checked="" type="radio"/> Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)								
<input type="radio"/> Specify Qsoil and Qbuilding separately; calculate ratio								
	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment

Building setting	Bldg_Setting	Commercial	Commercial		
Foundation type	Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019
Enclosed space floor area	(m ²)	Abf	1500.00	1500.00	80-1000
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05
Indoor air exchange rate	(l / hr)	ach	1.50	1.50	.3-4.1
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05
Calc: Building ventilation rate	(m ³ /hr)	Qb	6750.00	6750.00	NA
Calc: Average vapor flow rate into building	(m ³ /hr)	Qsoil	20.25	20.25	NA

Model Input Site Name/Run Number: Example, Run 1
 Chemical Name: Tetrachloroethylene CAS No. 127-18-4
 Depth below grade to water table: 6.50 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Silt					
Stratum A thickness (from surface)	(m)	hSA	6.50					
Stratum A total porosity	(-)	nSA	0.489	0.489	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.167	0.167	0.05 - 0.28	0.25		
Stratum A bulk density	(g/cm ³)	rhoSA	1.350	1.350	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Silt					
Stratum B thickness	(m)	hSB	0.00				WARNING	hsB < hcZ; hcZ may be overestimated.
Stratum B total porosity	(-)	nSB	0.489	0.489	NA	0.20		
Stratum B water-filled porosity	(-)	nwSB	0.167	0.167	0.05 - 0.28	0.25		
Stratum B bulk density	(g/cm ³)	rhoSB	1.350	1.350	NA	0.05		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm ³)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum B					

Height of capillary fringe	(m)	hc _z	1.630	1.630	NA	NA		
Capillary zone total porosity	(-)	nc _z	0.489	0.489	NA	0.20		
Capillary zone water filled porosity	(-)	nwc _z	0.382	0.382	NA	0.24		
Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	AT _c	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	AT _{nc}	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA	NOTE	MMOAF not relevant for non-mutagenic

Model Output	Site Name/Run Number:				Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.		
Chemical Name: Tetrachloroethylene	CAS No. 127-18-4						
Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag
Groundwater to indoor air attenuation coefficient	(-)	alpha	5.9E-06	5.6E-06 - 5.9E-06	5.9E-06	5.6E-06 - 5.9E-06	WARNING
Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag
Indoor air concentration due to vapor intrusion	(ug/m ³)	C _{ia}	2.1E+00	2.0E+00 - 2.1E+00	2.1E+00	2.0E+00 - 2.1E+00	
	(ppbv)		3.2E-01	3.0E-01 - 3.2E-01	3.2E-01	3.0E-01 - 3.2E-01	WARNING
Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag
Subslab vapor concentration	(ug/m ³) (ppbv)	C _{ss}	7.1E+02 1.1E+02	4.3E+01 - 2.0E+04 6.3E+00 - 3.0E+03	7.1E+02 1.1E+02	2.0E+04 - 2.1E+04 3.0E+03 - 3.2E+03	
Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag
Effective diffusion coefficient through Stratum A	(cm ² /sec)	DeffA	4.8E-03	-	4.8E-03	-	
Effective diffusion coefficient through Stratum B	(cm ² /sec)	DeffB	4.8E-03	-	4.8E-03	-	
Effective diffusion coefficient through Stratum C	(cm ² /sec)	DeffC	-	-	-	-	
Effective diffusion coefficient through capillary zone	(cm ² /sec)	DeffCZ	1.3E-04	-	1.3E-04	-	
Effective diffusion coefficient through unsaturated zone	(cm ² /sec)	DeffT	4.6E-04	-	4.6E-04	-	
Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	5.9E-06	-	5.9E-06		

Model Input**Site Name/Run Number:**

Example, Run 1

Note:

- Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
- Dotted outline cells indicate default values that may be changed with justification.
- Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

[Use English / Metric Converter](#)

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	500		NA			
Depth below grade to water table	(m)	Ls	5.00		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	25	25	3 - 25			
Calc: Source vapor concentration	(ug/m ³)	Cs	361919					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.219%					
Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Tetrachloroethylene					
CAS No.		CAS	127-18-4					
Toxicity Factors								
Unit risk factor	(ug/m ³) ⁻¹	IUR	2.60E-07	2.60E-07	NA	NA		
Mutagenic compound		Mut	No		NA	NA		
Reference concentration	(mg/m ³)	RfC	4.00E-02	4.00E-02	NA	NA		
Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	2.06E+02	2.06E+02	NA	NA		
Henry's Law Constant @ 25°C	(atm·m ³ /mol)	Hc	1.77E-02	1.77E-02	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	7.24E-01	7.24E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	7.24E-01	7.24E-01				
Diffusivity in air	(cm ² /s)	Dair	5.05E-02	5.05E-02	NA	NA		
Diffusivity in water	(cm ² /s)	Dwater	9.46E-06	9.46E-06	NA	NA		
Building Characteristics:								
Select Building Assumptions								
<input checked="" type="radio"/> Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)								
<input type="radio"/> Specify Qsoil and Qbuilding separately; calculate ratio								
	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment

Building setting	Bldg_Setting	Commercial	Commercial		
Foundation type	Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019
Enclosed space floor area	(m ²)	Abf	1500.00	1500.00	80-1000
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05
Indoor air exchange rate	(l / hr)	ach	1.50	1.50	.3-4.1
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05
Calc: Building ventilation rate	(m ³ /hr)	Qb	6750.00	6750.00	NA
Calc: Average vapor flow rate into building	(m ³ /hr)	Qsoil	20.25	20.25	NA

Model Input Site Name/Run Number: Example, Run 1
 Chemical Name: Tetrachloroethylene CAS No. 127-18-4
 Depth below grade to water table: 5.00 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Silt					
Stratum A thickness (from surface)	(m)	hSA	5.00					
Stratum A total porosity	(-)	nSA	0.489	0.489	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.167	0.167	0.05 - 0.28	0.25		
Stratum A bulk density	(g/cm ³)	rhoSA	1.350	1.350	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Silt					
Stratum B thickness	(m)	hSB	0.00				WARNING	hsB < hcZ; hcZ may be overestimated.
Stratum B total porosity	(-)	nSB	0.489	0.489	NA	0.20		
Stratum B water-filled porosity	(-)	nwSB	0.167	0.167	0.05 - 0.28	0.25		
Stratum B bulk density	(g/cm ³)	rhoSB	1.350	1.350	NA	0.05		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm ³)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum B					

Height of capillary fringe	(m)	hc _z	1.630	1.630	NA	NA		
Capillary zone total porosity	(-)	nc _z	0.489	0.489	NA	0.20		
Capillary zone water filled porosity	(-)	nwc _z	0.382	0.382	NA	0.24		
Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	AT _c	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	AT _{nc}	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA	NOTE	MMOAF not relevant for non-mutagenic

Model Output	Site Name/Run Number:				Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.		
Chemical Name: Tetrachloroethylene	CAS No. 127-18-4						
Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag
Groundwater to indoor air attenuation coefficient	(-)	alpha	6.0E-06	5.7E-06 - 6.1E-06	6.0E-06	5.7E-06 - 6.1E-06	WARNING
Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag
Indoor air concentration due to vapor intrusion	(ug/m ³)	C _{ia}	2.2E+00	2.1E+00 - 2.2E+00	2.2E+00	2.1E+00 - 2.2E+00	
	(ppbv)		3.2E-01	3.0E-01 - 3.2E-01	3.2E-01	3.0E-01 - 3.2E-01	WARNING
Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag
Subslab vapor concentration	(ug/m ³) (ppbv)	C _{ss}	7.3E+02 1.1E+02	4.4E+01 - 2.1E+04 6.5E+00 - 3.0E+03	7.3E+02 1.1E+02	2.1E+04 - 2.2E+04 3.0E+03 - 3.2E+03	
Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag
Effective diffusion coefficient through Stratum A	(cm ² /sec)	DeffA	4.8E-03	-	4.8E-03	-	
Effective diffusion coefficient through Stratum B	(cm ² /sec)	DeffB	4.8E-03	-	4.8E-03	-	
Effective diffusion coefficient through Stratum C	(cm ² /sec)	DeffC	-	-	-	-	
Effective diffusion coefficient through capillary zone	(cm ² /sec)	DeffCZ	1.3E-04	-	1.3E-04	-	
Effective diffusion coefficient through unsaturated zone	(cm ² /sec)	DeffT	3.6E-04	-	3.6E-04	-	
Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	6.1E-06	-	6.1E-06		

Model Input**Site Name/Run Number:**

Example, Run 1

Note:

- Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
- Dotted outline cells indicate default values that may be changed with justification.
- Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

[Use English / Metric Converter](#)

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	500		NA			
Depth below grade to water table	(m)	Ls	3.00		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	25	25	3 - 25			
Calc: Source vapor concentration	(ug/m ³)	Cs	361919					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.219%					
Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Tetrachloroethylene					
CAS No.		CAS	127-18-4					
Toxicity Factors								
Unit risk factor	(ug/m ³) ⁻¹	IUR	2.60E-07	2.60E-07	NA	NA		
Mutagenic compound		Mut	No	NA	NA	NA		
Reference concentration	(mg/m ³)	RfC	4.00E-02	4.00E-02	NA	NA		
Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	2.06E+02	2.06E+02	NA	NA		
Henry's Law Constant @ 25°C	(atm·m ³ /mol)	Hc	1.77E-02	1.77E-02	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	7.24E-01	7.24E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	7.24E-01	7.24E-01				
Diffusivity in air	(cm ² /s)	Dair	5.05E-02	5.05E-02	NA	NA		
Diffusivity in water	(cm ² /s)	Dwater	9.46E-06	9.46E-06	NA	NA		
Building Characteristics:								
Select Building Assumptions								
<input checked="" type="radio"/> Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)								
<input type="radio"/> Specify Qsoil and Qbuilding separately; calculate ratio								
	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment

Building setting	Bldg_Setting	Commercial	Commercial		
Foundation type	Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019
Enclosed space floor area	(m ²)	Abf	1500.00	1500.00	80-1000
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05
Indoor air exchange rate	(l / hr)	ach	1.50	1.50	.3-4.1
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05
Calc: Building ventilation rate	(m ³ /hr)	Qb	6750.00	6750.00	NA
Calc: Average vapor flow rate into building	(m ³ /hr)	Qsoil	20.25	20.25	NA

Model Input Site Name/Run Number: Example, Run 1
 Chemical Name: Tetrachloroethylene CAS No. 127-18-4
 Depth below grade to water table: 3.00 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Clay					
Stratum A thickness (from surface)	(m)	hSA	1.50					
Stratum A total porosity	(-)	nSA	0.459	0.459	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.215	0.215	0.098 - 0.33	0.25		
Stratum A bulk density	(g/cm ³)	rhoSA	1.430	1.430	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Sandy Clay					
Stratum B thickness	(m)	hSB	1.50					
Stratum B total porosity	(-)	nSB	0.385	0.385	NA	0.20		
Stratum B water-filled porosity	(-)	nwSB	0.197	0.197	0.117 - 0.28	0.25		
Stratum B bulk density	(g/cm ³)	rhoSB	1.630	1.630	NA	0.05		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm ³)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum B					

Height of capillary fringe	(m)	hc _z	0.300	0.300	NA	NA		
Capillary zone total porosity	(-)	nc _z	0.385	0.385	NA	0.20		
Capillary zone water filled porosity	(-)	nwc _z	0.355	0.355	NA	0.13		
Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	AT _c	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	AT _{nc}	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA	NOTE	MMOAF not relevant for non-mutagenic

Model Output	Site Name/Run Number:				Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.		
Chemical Name: Tetrachloroethylene	CAS No. 127-18-4						
Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag
Groundwater to indoor air attenuation coefficient	(-)	alpha	1.5E-06	1.5E-06 - 1.5E-06	1.5E-06	1.5E-06 - 1.5E-06	
Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag
Indoor air concentration due to vapor intrusion	(ug/m ³)	C _{ia}	5.5E-01	5.4E-01 - 5.5E-01	5.5E-01	5.4E-01 - 5.5E-01	
	(ppbv)		8.1E-02	8.0E-02 - 8.1E-02	8.1E-02	8.0E-02 - 8.1E-02	
Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag
Subslab vapor concentration	(ug/m ³) (ppbv)	C _{ss}	1.8E+02 2.7E+01	1.1E+01 - 5.4E+03 1.6E+00 - 8.0E+02	1.8E+02 2.7E+01	5.4E+03 - 5.5E+03 8.0E+02 - 8.1E+02	
Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag
Effective diffusion coefficient through Stratum A	(cm ² /sec)	DeffA	2.2E-03	-	2.2E-03	-	
Effective diffusion coefficient through Stratum B	(cm ² /sec)	DeffB	1.3E-03	-	1.3E-03	-	
Effective diffusion coefficient through Stratum C	(cm ² /sec)	DeffC	-	-	-	-	
Effective diffusion coefficient through capillary zone	(cm ² /sec)	DeffCZ	5.7E-06	-	5.7E-06	-	
Effective diffusion coefficient through unsaturated zone	(cm ² /sec)	DeffT	5.2E-05	-	5.2E-05	-	
Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	1.5E-06	-	1.5E-06		

Model Input**Site Name/Run Number:**

Example, Run 1

Note:

- Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
- Dotted outline cells indicate default values that may be changed with justification.
- Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

[Use English / Metric Converter](#)

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	500		NA			
Depth below grade to water table	(m)	Ls	6.00		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	25	25	3 - 25			
Calc: Source vapor concentration	(ug/m ³)	Cs	361919					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.219%					
Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Tetrachloroethylene					
CAS No.		CAS	127-18-4					
Toxicity Factors								
Unit risk factor	(ug/m ³) ⁻¹	IUR	2.60E-07	2.60E-07	NA	NA		
Mutagenic compound		Mut	No	NA	NA	NA		
Reference concentration	(mg/m ³)	RfC	4.00E-02	4.00E-02	NA	NA		
Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	2.06E+02	2.06E+02	NA	NA		
Henry's Law Constant @ 25°C	(atm·m ³ /mol)	Hc	1.77E-02	1.77E-02	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	7.24E-01	7.24E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	7.24E-01	7.24E-01				
Diffusivity in air	(cm ² /s)	Dair	5.05E-02	5.05E-02	NA	NA		
Diffusivity in water	(cm ² /s)	Dwater	9.46E-06	9.46E-06	NA	NA		
Building Characteristics:								
Select Building Assumptions								
<input checked="" type="radio"/> Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)								
<input type="radio"/> Specify Qsoil and Qbuilding separately; calculate ratio								
	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment

Building setting	Bldg_Setting	Commercial	Commercial		
Foundation type	Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019
Enclosed space floor area	(m ²)	Abf	1500.00	1500.00	80-1000
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05
Indoor air exchange rate	(l / hr)	ach	1.50	1.50	.3-4.1
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05
Calc: Building ventilation rate	(m ³ /hr)	Qb	6750.00	6750.00	NA
Calc: Average vapor flow rate into building	(m ³ /hr)	Qsoil	20.25	20.25	NA

Model Input Site Name/Run Number: Example, Run 1
 Chemical Name: Tetrachloroethylene CAS No. 127-18-4
 Depth below grade to water table: 6.00 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Clay					
Stratum A thickness (from surface)	(m)	hSA	3.00					
Stratum A total porosity	(-)	nSA	0.459	0.459	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.215	0.215	0.098 - 0.33	0.25		
Stratum A bulk density	(g/cm ³)	rhoSA	1.430	1.430	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Sandy Clay					
Stratum B thickness	(m)	hSB	3.00					
Stratum B total porosity	(-)	nSB	0.385	0.385	NA	0.20		
Stratum B water-filled porosity	(-)	nwSB	0.197	0.197	0.117 - 0.28	0.25		
Stratum B bulk density	(g/cm ³)	rhoSB	1.630	1.630	NA	0.05		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm ³)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum B					

Height of capillary fringe	(m)	hc _z	0.300	0.300	NA	NA		
Capillary zone total porosity	(-)	nc _z	0.385	0.385	NA	0.20		
Capillary zone water filled porosity	(-)	nwc _z	0.355	0.355	NA	0.13		
Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	AT _c	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	AT _{nc}	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA	NOTE	MMOAF not relevant for non-mutagenic

Model Output	Site Name/Run Number:				Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.		
Chemical Name: Tetrachloroethylene	CAS No. 127-18-4						
Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag
Groundwater to indoor air attenuation coefficient	(-)	alpha	1.5E-06	1.4E-06 - 1.5E-06	1.5E-06	1.4E-06 - 1.5E-06	
Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag
Indoor air concentration due to vapor intrusion	(ug/m ³)	C _{ia}	5.3E-01	5.2E-01 - 5.3E-01	5.3E-01	5.2E-01 - 5.3E-01	
	(ppbv)		7.8E-02	7.7E-02 - 7.8E-02	7.8E-02	7.7E-02 - 7.8E-02	
Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag
Subslab vapor concentration	(ug/m ³) (ppbv)	C _{ss}	1.8E+02 2.6E+01	1.1E+01 - 5.2E+03 1.6E+00 - 7.7E+02	1.8E+02 2.6E+01	5.2E+03 - 5.3E+03 7.7E+02 - 7.8E+02	
Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag
Effective diffusion coefficient through Stratum A	(cm ² /sec)	DeffA	2.2E-03	-	2.2E-03	-	
Effective diffusion coefficient through Stratum B	(cm ² /sec)	DeffB	1.3E-03	-	1.3E-03	-	
Effective diffusion coefficient through Stratum C	(cm ² /sec)	DeffC	-	-	-	-	
Effective diffusion coefficient through capillary zone	(cm ² /sec)	DeffCZ	5.7E-06	-	5.7E-06	-	
Effective diffusion coefficient through unsaturated zone	(cm ² /sec)	DeffT	1.0E-04	-	1.0E-04	-	
Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	1.5E-06	-	1.5E-06		

Model Input**Site Name/Run Number:**

Example, Run 1

Note:

- Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
- Dotted outline cells indicate default values that may be changed with justification.
- Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

[Use English / Metric Converter](#)

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	500		NA			
Depth below grade to water table	(m)	Ls	5.50		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	25	25	3 - 25			
Calc: Source vapor concentration	(ug/m ³)	Cs	361919					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.219%					
Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Tetrachloroethylene					
CAS No.		CAS	127-18-4					
Toxicity Factors								
Unit risk factor	(ug/m ³) ⁻¹	IUR	2.60E-07	2.60E-07	NA	NA		
Mutagenic compound		Mut	No		NA	NA		
Reference concentration	(mg/m ³)	RfC	4.00E-02	4.00E-02	NA	NA		
Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	2.06E+02	2.06E+02	NA	NA		
Henry's Law Constant @ 25°C	(atm·m ³ /mol)	Hc	1.77E-02	1.77E-02	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	7.24E-01	7.24E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	7.24E-01	7.24E-01				
Diffusivity in air	(cm ² /s)	Dair	5.05E-02	5.05E-02	NA	NA		
Diffusivity in water	(cm ² /s)	Dwater	9.46E-06	9.46E-06	NA	NA		
Building Characteristics:								
Select Building Assumptions								
<input checked="" type="radio"/> Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)								
<input type="radio"/> Specify Qsoil and Qbuilding separately; calculate ratio								
	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment

Building setting	Bldg_Setting	Commercial	Commercial		
Foundation type	Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019
Enclosed space floor area	(m ²)	Abf	1500.00	1500.00	80-1000
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05
Indoor air exchange rate	(l / hr)	ach	1.50	1.50	.3-4.1
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05
Calc: Building ventilation rate	(m ³ /hr)	Qb	6750.00	6750.00	NA
Calc: Average vapor flow rate into building	(m ³ /hr)	Qsoil	20.25	20.25	NA

Model Input Site Name/Run Number: Example, Run 1
 Chemical Name: Tetrachloroethylene CAS No. 127-18-4
 Depth below grade to water table: 5.50 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Silt					
Stratum A thickness (from surface)	(m)	hSA	5.50					
Stratum A total porosity	(-)	nSA	0.489	0.489	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.167	0.167	0.05 - 0.28	0.25		
Stratum A bulk density	(g/cm ³)	rhoSA	1.350	1.350	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Silt					
Stratum B thickness	(m)	hSB	0.00				WARNING	hsB < hcZ; hcZ may be overestimated.
Stratum B total porosity	(-)	nSB	0.489	0.489	NA	0.20		
Stratum B water-filled porosity	(-)	nwSB	0.167	0.167	0.05 - 0.28	0.25		
Stratum B bulk density	(g/cm ³)	rhoSB	1.350	1.350	NA	0.05		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm ³)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum B					

Height of capillary fringe	(m)	hc _z	1.630	1.630	NA	NA		
Capillary zone total porosity	(-)	nc _z	0.489	0.489	NA	0.20		
Capillary zone water filled porosity	(-)	nwc _z	0.382	0.382	NA	0.24		
Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	AT _c	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	AT _{nc}	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA	NOTE	MMOAF not relevant for non-mutagenic

Model Output	Site Name/Run Number:				Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.		
Chemical Name: Tetrachloroethylene	CAS No. 127-18-4						
Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag
Groundwater to indoor air attenuation coefficient	(-)	alpha	6.0E-06	5.7E-06 - 6.0E-06	6.0E-06	5.7E-06 - 6.0E-06	WARNING
Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag
Indoor air concentration due to vapor intrusion	(ug/m ³)	C _{ia}	2.2E+00	2.1E+00 - 2.2E+00	2.2E+00	2.1E+00 - 2.2E+00	
	(ppbv)		3.2E-01	3.0E-01 - 3.2E-01	3.2E-01	3.0E-01 - 3.2E-01	WARNING
Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag
Subslab vapor concentration	(ug/m ³) (ppbv)	C _{ss}	7.2E+02 1.1E+02	4.3E+01 - 2.1E+04 6.4E+00 - 3.0E+03	7.2E+02 1.1E+02	2.1E+04 - 2.2E+04 3.0E+03 - 3.2E+03	
Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag
Effective diffusion coefficient through Stratum A	(cm ² /sec)	DeffA	4.8E-03	-	4.8E-03	-	
Effective diffusion coefficient through Stratum B	(cm ² /sec)	DeffB	4.8E-03	-	4.8E-03	-	
Effective diffusion coefficient through Stratum C	(cm ² /sec)	DeffC	-	-	-	-	
Effective diffusion coefficient through capillary zone	(cm ² /sec)	DeffCZ	1.3E-04	-	1.3E-04	-	
Effective diffusion coefficient through unsaturated zone	(cm ² /sec)	DeffT	3.9E-04	-	3.9E-04	-	
Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	6.0E-06	-	6.0E-06		

Model Input**Site Name/Run Number:**

Example, Run 1

Note:

- Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
- Dotted outline cells indicate default values that may be changed with justification.
- Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

[Use English / Metric Converter](#)

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	500		NA			
Depth below grade to water table	(m)	Ls	0.50		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	25	25	3 - 25		WARNING	Ls must be >= MAX(Lb + hc _z , Lb + 1 m)
Calc: Source vapor concentration	(ug/m ³)	Cs	201407					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.041%					
Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m ³) ⁻¹	IUR	see note	see note	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m ³)	RfC	2.00E-03	2.00E-03	NA	NA		
Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25°C	(atm·m ³ /mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	4.03E-01	4.03E-01				
Diffusivity in air	(cm ² /s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm ² /s)	Dwater	1.02E-05	1.02E-05	NA	NA		
Building Characteristics:								
Select Building Assumptions								
<input checked="" type="radio"/> Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)								
<input type="radio"/> Specify Qsoil and Qbuilding separately; calculate ratio								
	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment

Building setting	Bldg_Setting	Commercial	Commercial		
Foundation type	Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019
Enclosed space floor area	(m ²)	Abf	1500.00	1500.00	80-1000
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05
Indoor air exchange rate	(l / hr)	ach	1.50	1.50	.3-4.1
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05
Calc: Building ventilation rate	(m ³ /hr)	Qb	6750.00	6750.00	NA
Calc: Average vapor flow rate into building	(m ³ /hr)	Qsoil	20.25	20.25	NA

Model Input Site Name/Run Number: Example, Run 1
 Chemical Name: Trichloroethylene CAS No. 79-01-6
 Depth below grade to water table: 0.50 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Silt					
Stratum A thickness (from surface)	(m)	hSA	0.50					
Stratum A total porosity	(-)	nSA	0.489	0.489	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.167	0.167	0.05 - 0.28	0.25		
Stratum A bulk density	(g/cm ³)	rhoSA	1.350	1.350	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Silt					
Stratum B thickness	(m)	hSB	0.00				ERROR	hSB+hSA must be >= hc _z .
Stratum B total porosity	(-)	nSB	0.489	0.489	NA	0.20		
Stratum B water-filled porosity	(-)	nwSB	0.167	0.167	0.05 - 0.28	0.25		
Stratum B bulk density	(g/cm ³)	rhoSB	1.350	1.350	NA	0.05		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm ³)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum B					

Height of capillary fringe	(m)	hc _z	1.630	1.630	NA	NA		
Capillary zone total porosity	(-)	nc _z	0.489	0.489	NA	0.20		
Capillary zone water filled porosity	(-)	nwc _z	0.382	0.382	NA	0.24		
Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	AT _c	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	AT _{nc}	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calcu

Model Output		Site Name/Run Number:		Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.				
Chemical Name: Trichloroethylene		CAS No. 79-01-6						
Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	
Groundwater to indoor air attenuation coefficient	(-)	alpha	8.9E-06	8.2E-06 - 8.9E-06	8.9E-06	8.2E-06 - 8.9E-06	ERROR	WARNING
Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	
Indoor air concentration due to vapor intrusion	(ug/m ³)	C _{ia}	1.8E+00	1.6E+00 - 1.8E+00	1.8E+00	1.6E+00 - 1.8E+00	ERROR	
	(ppbv)		3.3E-01	3.1E-01 - 3.3E-01	3.3E-01	3.1E-01 - 3.3E-01		WARNING
Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	
Subslab vapor concentration	(ug/m ³)	C _{ss}	6.0E+02	3.6E+01 - 1.6E+04	6.0E+02	1.6E+04 - 1.8E+04		
	(ppbv)		1.1E+02	6.7E+00 - 3.1E+03	1.1E+02	3.1E+03 - 3.3E+03		
Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	
Effective diffusion coefficient through Stratum A	(cm ² /sec)	DeffA	6.6E-03	-	6.6E-03	-		
Effective diffusion coefficient through Stratum B	(cm ² /sec)	DeffB	6.6E-03	-	6.6E-03	-		
Effective diffusion coefficient through Stratum C	(cm ² /sec)	DeffC	-	-	-	-		
Effective diffusion coefficient through capillary zone	(cm ² /sec)	DeffCZ	1.7E-04	-	1.7E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm ² /sec)	DeffT	3.3E-05	-	3.3E-05	-		
Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag	
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	8.9E-06	-	8.9E-06	-		

Model Input**Site Name/Run Number:**

Example, Run 1

Note:

- Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
- Dotted outline cells indicate default values that may be changed with justification.
- Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

[Use English / Metric Converter](#)

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	500		NA			
Depth below grade to water table	(m)	Ls	5.00		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	25	25	3 - 25			
Calc: Source vapor concentration	(ug/m ³)	Cs	201407					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.041%					
Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m ³) ⁻¹	IUR	see note	see note	NA	NA		
Mutagenic compound		Mut	Yes		NA	NA		
Reference concentration	(mg/m ³)	RfC	2.00E-03	2.00E-03	NA	NA		
Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25°C	(atm·m ³ /mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	4.03E-01	4.03E-01				
Diffusivity in air	(cm ² /s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm ² /s)	Dwater	1.02E-05	1.02E-05	NA	NA		
Building Characteristics:								
Select Building Assumptions								
<input checked="" type="radio"/> Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)								
<input type="radio"/> Specify Qsoil and Qbuilding separately; calculate ratio								
	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment

Building setting	Bldg_Setting	Commercial	Commercial		
Foundation type	Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019
Enclosed space floor area	(m ²)	Abf	1500.00	1500.00	80-1000
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05
Indoor air exchange rate	(l / hr)	ach	1.50	1.50	.3-4.1
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05
Calc: Building ventilation rate	(m ³ /hr)	Qb	6750.00	6750.00	NA
Calc: Average vapor flow rate into building	(m ³ /hr)	Qsoil	20.25	20.25	NA

Model Input Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Depth below grade to water table: 5.00 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Silt					
Stratum A thickness (from surface)	(m)	hSA	2.50					
Stratum A total porosity	(-)	nSA	0.489	0.489	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.167	0.167	0.05 - 0.28	0.25		
Stratum A bulk density	(g/cm ³)	rhoSA	1.350	1.350	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Clay					
Stratum B thickness	(m)	hSB	2.50					
Stratum B total porosity	(-)	nSB	0.459	0.459	NA	0.20		
Stratum B water-filled porosity	(-)	nwSB	0.215	0.215	0.098 - 0.33	0.25		
Stratum B bulk density	(g/cm ³)	rhoSB	1.430	1.430	NA	0.05		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm ³)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum B					

Height of capillary fringe	(m)	hc _z	0.815	0.815	NA	NA		
Capillary zone total porosity	(-)	nc _z	0.459	0.459	NA	0.20		
Capillary zone water filled porosity	(-)	nwc _z	0.412	0.412	NA	0.24		
Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	AT _c	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	AT _{nc}	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calcu

Model Output	Site Name/Run Number:			Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.			
Chemical Name: Trichloroethylene	CAS No. 79-01-6						
Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag
Groundwater to indoor air attenuation coefficient	(-)	alpha	1.8E-06	1.8E-06 - 1.8E-06	1.8E-06	1.8E-06 - 1.8E-06	
Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag
Indoor air concentration due to vapor intrusion	(ug/m ³)	C _{ia}	3.7E-01	3.6E-01 - 3.7E-01	3.7E-01	3.6E-01 - 3.7E-01	
	(ppbv)		6.9E-02	6.8E-02 - 6.9E-02	6.9E-02	6.8E-02 - 6.9E-02	
Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag
Subslab vapor concentration	(ug/m ³) (ppbv)	C _{ss}	1.2E+02 2.3E+01	7.4E+00 - 3.6E+03 1.4E+00 - 6.8E+02	1.2E+02 2.3E+01	3.6E+03 - 3.7E+03 6.8E+02 - 6.9E+02	
Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag
Effective diffusion coefficient through Stratum A	(cm ² /sec)	DeffA	6.6E-03	-	6.6E-03	-	
Effective diffusion coefficient through Stratum B	(cm ² /sec)	DeffB	3.0E-03	-	3.0E-03	-	
Effective diffusion coefficient through Stratum C	(cm ² /sec)	DeffC	-	-	-	-	
Effective diffusion coefficient through capillary zone	(cm ² /sec)	DeffCZ	1.9E-05	-	1.9E-05	-	
Effective diffusion coefficient through unsaturated zone	(cm ² /sec)	DeffT	1.1E-04	-	1.1E-04	-	
Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	1.8E-06	-	1.8E-06		

Model Input**Site Name/Run Number:**

Example, Run 1

Note:

- Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
- Dotted outline cells indicate default values that may be changed with justification.
- Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

[Use English / Metric Converter](#)

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	500		NA			
Depth below grade to water table	(m)	Ls	6.00		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	25	25	3 - 25			
Calc: Source vapor concentration	(ug/m ³)	Cs	201407					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.041%					
Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m ³) ⁻¹	IUR	see note	see note	NA	NA		
Mutagenic compound		Mut	Yes		NA	NA		
Reference concentration	(mg/m ³)	RfC	2.00E-03	2.00E-03	NA	NA		
Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25°C	(atm·m ³ /mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	4.03E-01	4.03E-01				
Diffusivity in air	(cm ² /s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm ² /s)	Dwater	1.02E-05	1.02E-05	NA	NA		
Building Characteristics:								
Select Building Assumptions								
<input checked="" type="radio"/> Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)								
<input type="radio"/> Specify Qsoil and Qbuilding separately; calculate ratio								
	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment

Building setting	Bldg_Setting	Commercial	Commercial		
Foundation type	Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019
Enclosed space floor area	(m ²)	Abf	1500.00	1500.00	80-1000
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05
Indoor air exchange rate	(l / hr)	ach	1.50	1.50	.3-4.1
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05
Calc: Building ventilation rate	(m ³ /hr)	Qb	6750.00	6750.00	NA
Calc: Average vapor flow rate into building	(m ³ /hr)	Qsoil	20.25	20.25	NA

Model Input Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Depth below grade to water table: 6.00 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Clay					
Stratum A thickness (from surface)	(m)	hSA	3.00					
Stratum A total porosity	(-)	nSA	0.459	0.459	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.215	0.215	0.098 - 0.33	0.25		
Stratum A bulk density	(g/cm ³)	rhoSA	1.430	1.430	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Sandy Clay					
Stratum B thickness	(m)	hSB	3.00					
Stratum B total porosity	(-)	nSB	0.385	0.385	NA	0.20		
Stratum B water-filled porosity	(-)	nwSB	0.197	0.197	0.117 - 0.28	0.25		
Stratum B bulk density	(g/cm ³)	rhoSB	1.630	1.630	NA	0.05		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm ³)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum B					

Height of capillary fringe	(m)	hc _z	0.300	0.300	NA	NA		
Capillary zone total porosity	(-)	nc _z	0.385	0.385	NA	0.20		
Capillary zone water filled porosity	(-)	nwc _z	0.355	0.355	NA	0.13		
Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	AT _c	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	AT _{nc}	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calcu

Model Output	Site Name/Run Number:			Range			
Chemical Name: Trichloroethylene CAS No. 79-01-6			is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.				
Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag
Groundwater to indoor air attenuation coefficient	(-)	alpha	2.4E-06	2.3E-06 - 2.4E-06	2.4E-06	2.3E-06 - 2.4E-06	
Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag
Indoor air concentration due to vapor intrusion	(ug/m ³)	C _{ia}	4.8E-01	4.7E-01 - 4.8E-01	4.8E-01	4.7E-01 - 4.8E-01	
	(ppbv)		8.9E-02	8.7E-02 - 8.9E-02	8.9E-02	8.7E-02 - 8.9E-02	
Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag
Subslab vapor concentration	(ug/m ³) (ppbv)	C _{ss}	1.6E+02 3.0E+01	9.6E+00 - 4.7E+03 1.8E+00 - 8.7E+02	1.6E+02 3.0E+01	4.7E+03 - 4.8E+03 8.7E+02 - 8.9E+02	
Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag
Effective diffusion coefficient through Stratum A	(cm ² /sec)	DeffA	3.0E-03	-	3.0E-03	-	
Effective diffusion coefficient through Stratum B	(cm ² /sec)	DeffB	1.8E-03	-	1.8E-03	-	
Effective diffusion coefficient through Stratum C	(cm ² /sec)	DeffC	-	-	-	-	
Effective diffusion coefficient through capillary zone	(cm ² /sec)	DeffCZ	9.4E-06	-	9.4E-06	-	
Effective diffusion coefficient through unsaturated zone	(cm ² /sec)	DeffT	1.7E-04	-	1.7E-04	-	
Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.4E-06	-	2.4E-06		

Model Input**Site Name/Run Number:**

Example, Run 1

Note:

- Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
- Dotted outline cells indicate default values that may be changed with justification.
- Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

[Use English / Metric Converter](#)

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	500		NA			
Depth below grade to water table	(m)	Ls	6.50		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	25	25	3 - 25			
Calc: Source vapor concentration	(ug/m ³)	Cs	201407					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.041%					
Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m ³) ⁻¹	IUR	see note	see note	NA	NA		
Mutagenic compound		Mut	Yes		NA	NA		
Reference concentration	(mg/m ³)	RfC	2.00E-03	2.00E-03	NA	NA		
Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25°C	(atm·m ³ /mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	4.03E-01	4.03E-01				
Diffusivity in air	(cm ² /s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm ² /s)	Dwater	1.02E-05	1.02E-05	NA	NA		
Building Characteristics:								
Select Building Assumptions								
<input checked="" type="radio"/> Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)								
<input type="radio"/> Specify Qsoil and Qbuilding separately; calculate ratio								
	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment

Building setting	Bldg_Setting	Commercial	Commercial		
Foundation type	Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019
Enclosed space floor area	(m ²)	Abf	1500.00	1500.00	80-1000
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05
Indoor air exchange rate	(l / hr)	ach	1.50	1.50	.3-4.1
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05
Calc: Building ventilation rate	(m ³ /hr)	Qb	6750.00	6750.00	NA
Calc: Average vapor flow rate into building	(m ³ /hr)	Qsoil	20.25	20.25	NA

Model Input Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Depth below grade to water table: 6.50 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Silt					
Stratum A thickness (from surface)	(m)	hSA	6.50					
Stratum A total porosity	(-)	nSA	0.489	0.489	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.167	0.167	0.05 - 0.28	0.25		
Stratum A bulk density	(g/cm ³)	rhoSA	1.350	1.350	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Silt					
Stratum B thickness	(m)	hSB	0.00				WARNING	hsB < hcZ; hcZ may be overestimated.
Stratum B total porosity	(-)	nSB	0.489	0.489	NA	0.20		
Stratum B water-filled porosity	(-)	nwSB	0.167	0.167	0.05 - 0.28	0.25		
Stratum B bulk density	(g/cm ³)	rhoSB	1.350	1.350	NA	0.05		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm ³)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum B					

Height of capillary fringe	(m)	hc _z	1.630	1.630	NA	NA		
Capillary zone total porosity	(-)	nc _z	0.489	0.489	NA	0.20		
Capillary zone water filled porosity	(-)	nwc _z	0.382	0.382	NA	0.24		
Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	AT _c	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	AT _{nc}	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calcu

Model Output	Site Name/Run Number:				Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.		
Chemical Name: Trichloroethylene CAS No. 79-01-6				Example, Run 1			
Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag
Groundwater to indoor air attenuation coefficient	(-)	alpha	8.1E-06	7.5E-06 - 8.1E-06	8.1E-06	7.5E-06 - 8.1E-06	WARNING
Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag
Indoor air concentration due to vapor intrusion	(ug/m ³)	C _{ia}	1.6E+00	1.5E+00 - 1.6E+00	1.6E+00	1.5E+00 - 1.6E+00	
	(ppbv)		3.0E-01	2.8E-01 - 3.0E-01	3.0E-01	2.8E-01 - 3.0E-01	WARNING
Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag
Subslab vapor concentration	(ug/m ³) (ppbv)	C _{ss}	5.4E+02 1.0E+02	3.3E+01 - 1.5E+04 6.1E+00 - 2.8E+03	5.4E+02 1.0E+02	1.5E+04 - 1.6E+04 2.8E+03 - 3.0E+03	
Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag
Effective diffusion coefficient through Stratum A	(cm ² /sec)	DeffA	6.6E-03	-	6.6E-03	-	
Effective diffusion coefficient through Stratum B	(cm ² /sec)	DeffB	6.6E-03	-	6.6E-03	-	
Effective diffusion coefficient through Stratum C	(cm ² /sec)	DeffC	-	-	-	-	
Effective diffusion coefficient through capillary zone	(cm ² /sec)	DeffCZ	1.7E-04	-	1.7E-04	-	
Effective diffusion coefficient through unsaturated zone	(cm ² /sec)	DeffT	6.3E-04	-	6.3E-04	-	
Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	8.1E-06	-	8.1E-06		

Model Input**Site Name/Run Number:**

Example, Run 1

Note:

- Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
- Dotted outline cells indicate default values that may be changed with justification.
- Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

[Use English / Metric Converter](#)

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	500		NA			
Depth below grade to water table	(m)	Ls	5.00		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	25	25	3 - 25			
Calc: Source vapor concentration	(ug/m ³)	Cs	201407					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.041%					
Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m ³) ⁻¹	IUR	see note	see note	NA	NA		
Mutagenic compound		Mut	Yes		NA	NA		
Reference concentration	(mg/m ³)	RfC	2.00E-03	2.00E-03	NA	NA		
Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25°C	(atm·m ³ /mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	4.03E-01	4.03E-01				
Diffusivity in air	(cm ² /s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm ² /s)	Dwater	1.02E-05	1.02E-05	NA	NA		
Building Characteristics:								
Select Building Assumptions								
<input checked="" type="radio"/> Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)								
<input type="radio"/> Specify Qsoil and Qbuilding separately; calculate ratio								
	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment

Building setting	Bldg_Setting	Commercial	Commercial		
Foundation type	Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019
Enclosed space floor area	(m ²)	Abf	1500.00	1500.00	80-1000
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05
Indoor air exchange rate	(l / hr)	ach	1.50	1.50	.3-4.1
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05
Calc: Building ventilation rate	(m ³ /hr)	Qb	6750.00	6750.00	NA
Calc: Average vapor flow rate into building	(m ³ /hr)	Qsoil	20.25	20.25	NA

Model Input Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Depth below grade to water table: 5.00 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Silt					
Stratum A thickness (from surface)	(m)	hSA	5.00					
Stratum A total porosity	(-)	nSA	0.489	0.489	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.167	0.167	0.05 - 0.28	0.25		
Stratum A bulk density	(g/cm ³)	rhoSA	1.350	1.350	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Silt					
Stratum B thickness	(m)	hSB	0.00				WARNING	hsB < hcZ; hcZ may be overestimated.
Stratum B total porosity	(-)	nSB	0.489	0.489	NA	0.20		
Stratum B water-filled porosity	(-)	nwSB	0.167	0.167	0.05 - 0.28	0.25		
Stratum B bulk density	(g/cm ³)	rhoSB	1.350	1.350	NA	0.05		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm ³)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum B					

Height of capillary fringe	(m)	hcZ	1.630	1.630	NA	NA		
Capillary zone total porosity	(-)	ncZ	0.489	0.489	NA	0.20		
Capillary zone water filled porosity	(-)	nwcZ	0.382	0.382	NA	0.24		
Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calcu

Model Output	Site Name/Run Number:				Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.		
Chemical Name: Trichloroethylene	CAS No. 79-01-6						
Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag
Groundwater to indoor air attenuation coefficient	(-)	alpha	8.3E-06	7.7E-06 - 8.3E-06	8.3E-06	7.7E-06 - 8.3E-06	WARNING
Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag
Indoor air concentration due to vapor intrusion	(ug/m3)	Cia	1.7E+00	1.5E+00 - 1.7E+00	1.7E+00	1.5E+00 - 1.7E+00	
	(ppbv)		3.1E-01	2.9E-01 - 3.1E-01	3.1E-01	2.9E-01 - 3.1E-01	WARNING
Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag
Subslab vapor concentration	(ug/m3) (ppbv)	Css	5.6E+02 1.0E+02	3.3E+01 - 1.5E+04 6.2E+00 - 2.9E+03	5.6E+02 1.0E+02	1.5E+04 - 1.7E+04 2.9E+03 - 3.1E+03	
Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag
Effective diffusion coefficient through Stratum A	(cm ² /sec)	DeffA	6.6E-03	-	6.6E-03	-	
Effective diffusion coefficient through Stratum B	(cm ² /sec)	DeffB	6.6E-03	-	6.6E-03	-	
Effective diffusion coefficient through Stratum C	(cm ² /sec)	DeffC	-	-	-	-	
Effective diffusion coefficient through capillary zone	(cm ² /sec)	DeffCZ	1.7E-04	-	1.7E-04	-	
Effective diffusion coefficient through unsaturated zone	(cm ² /sec)	DeffT	4.9E-04	-	4.9E-04	-	
Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	8.3E-06	-	8.3E-06		

Model Input**Site Name/Run Number:**

Example, Run 1

Note:

- Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
- Dotted outline cells indicate default values that may be changed with justification.
- Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

[Use English / Metric Converter](#)

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	500		NA			
Depth below grade to water table	(m)	Ls	3.00		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	25	25	3 - 25			
Calc: Source vapor concentration	(ug/m ³)	Cs	201407					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.041%					
Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m ³) ⁻¹	IUR	see note	see note	NA	NA		
Mutagenic compound		Mut	Yes		NA	NA		
Reference concentration	(mg/m ³)	RfC	2.00E-03	2.00E-03	NA	NA		
Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25°C	(atm·m ³ /mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	4.03E-01	4.03E-01				
Diffusivity in air	(cm ² /s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm ² /s)	Dwater	1.02E-05	1.02E-05	NA	NA		
Building Characteristics:								
Select Building Assumptions								
<input checked="" type="radio"/> Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)								
<input type="radio"/> Specify Qsoil and Qbuilding separately; calculate ratio								
	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment

Building setting	Bldg_Setting	Commercial	Commercial		
Foundation type	Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019
Enclosed space floor area	(m ²)	Abf	1500.00	1500.00	80-1000
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05
Indoor air exchange rate	(l / hr)	ach	1.50	1.50	.3-4.1
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05
Calc: Building ventilation rate	(m ³ /hr)	Qb	6750.00	6750.00	NA
Calc: Average vapor flow rate into building	(m ³ /hr)	Qsoil	20.25	20.25	NA

Model Input Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Depth below grade to water table: 3.00 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Clay					
Stratum A thickness (from surface)	(m)	hSA	1.50					
Stratum A total porosity	(-)	nSA	0.459	0.459	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.215	0.215	0.098 - 0.33	0.25		
Stratum A bulk density	(g/cm ³)	rhoSA	1.430	1.430	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Sandy Clay					
Stratum B thickness	(m)	hSB	1.50					
Stratum B total porosity	(-)	nSB	0.385	0.385	NA	0.20		
Stratum B water-filled porosity	(-)	nwSB	0.197	0.197	0.117 - 0.28	0.25		
Stratum B bulk density	(g/cm ³)	rhoSB	1.630	1.630	NA	0.05		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm ³)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum B					

Height of capillary fringe	(m)	hc _z	0.300	0.300	NA	NA		
Capillary zone total porosity	(-)	nc _z	0.385	0.385	NA	0.20		
Capillary zone water filled porosity	(-)	nwc _z	0.355	0.355	NA	0.13		
Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	AT _c	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	AT _{nc}	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calcu

Model Output	Site Name/Run Number:			Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.			
Chemical Name: Trichloroethylene	CAS No. 79-01-6						
Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag
Groundwater to indoor air attenuation coefficient	(-)	alpha	2.5E-06	2.4E-06 - 2.5E-06	2.5E-06	2.4E-06 - 2.5E-06	
Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag
Indoor air concentration due to vapor intrusion	(ug/m ³)	C _{ia}	5.0E-01	4.9E-01 - 5.0E-01	5.0E-01	4.9E-01 - 5.0E-01	
	(ppbv)		9.3E-02	9.1E-02 - 9.3E-02	9.3E-02	9.1E-02 - 9.3E-02	
Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag
Subslab vapor concentration	(ug/m ³) (ppbv)	C _{ss}	1.7E+02 3.1E+01	1.0E+01 - 4.9E+03 1.9E+00 - 9.1E+02	1.7E+02 3.1E+01	4.9E+03 - 5.0E+03 9.1E+02 - 9.3E+02	
Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag
Effective diffusion coefficient through Stratum A	(cm ² /sec)	DeffA	3.0E-03	-	3.0E-03	-	
Effective diffusion coefficient through Stratum B	(cm ² /sec)	DeffB	1.8E-03	-	1.8E-03	-	
Effective diffusion coefficient through Stratum C	(cm ² /sec)	DeffC	-	-	-	-	
Effective diffusion coefficient through capillary zone	(cm ² /sec)	DeffCZ	9.4E-06	-	9.4E-06	-	
Effective diffusion coefficient through unsaturated zone	(cm ² /sec)	DeffT	8.5E-05	-	8.5E-05	-	
Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.5E-06	-	2.5E-06		

Model Input**Site Name/Run Number:**

Example, Run 1

Note:

- Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
- Dotted outline cells indicate default values that may be changed with justification.
- Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

[Use English / Metric Converter](#)

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	500		NA			
Depth below grade to water table	(m)	Ls	6.00		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	25	25	3 - 25			
Calc: Source vapor concentration	(ug/m ³)	Cs	201407					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.041%					
Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m ³) ⁻¹	IUR	see note	see note	NA	NA		
Mutagenic compound		Mut	Yes		NA	NA		
Reference concentration	(mg/m ³)	RfC	2.00E-03	2.00E-03	NA	NA		
Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25°C	(atm·m ³ /mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	4.03E-01	4.03E-01				
Diffusivity in air	(cm ² /s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm ² /s)	Dwater	1.02E-05	1.02E-05	NA	NA		
Building Characteristics:								
Select Building Assumptions								
<input checked="" type="radio"/> Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)								
<input type="radio"/> Specify Qsoil and Qbuilding separately; calculate ratio								
	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment

Building setting	Bldg_Setting	Commercial	Commercial		
Foundation type	Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019
Enclosed space floor area	(m ²)	Abf	1500.00	1500.00	80-1000
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05
Indoor air exchange rate	(l / hr)	ach	1.50	1.50	.3-4.1
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05
Calc: Building ventilation rate	(m ³ /hr)	Qb	6750.00	6750.00	NA
Calc: Average vapor flow rate into building	(m ³ /hr)	Qsoil	20.25	20.25	NA

Model Input Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Depth below grade to water table: 6.00 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Clay					
Stratum A thickness (from surface)	(m)	hSA	3.00					
Stratum A total porosity	(-)	nSA	0.459	0.459	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.215	0.215	0.098 - 0.33	0.25		
Stratum A bulk density	(g/cm ³)	rhoSA	1.430	1.430	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Sandy Clay					
Stratum B thickness	(m)	hSB	3.00					
Stratum B total porosity	(-)	nSB	0.385	0.385	NA	0.20		
Stratum B water-filled porosity	(-)	nwSB	0.197	0.197	0.117 - 0.28	0.25		
Stratum B bulk density	(g/cm ³)	rhoSB	1.630	1.630	NA	0.05		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm ³)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum B					

Height of capillary fringe	(m)	hc _z	0.300	0.300	NA	NA		
Capillary zone total porosity	(-)	nc _z	0.385	0.385	NA	0.20		
Capillary zone water filled porosity	(-)	nwc _z	0.355	0.355	NA	0.13		
Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	AT _c	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	AT _{nc}	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calcu

Model Output	Site Name/Run Number:			Range			
Chemical Name: Trichloroethylene CAS No. 79-01-6			is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.				
Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag
Groundwater to indoor air attenuation coefficient	(-)	alpha	2.4E-06	2.3E-06 - 2.4E-06	2.4E-06	2.3E-06 - 2.4E-06	
Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag
Indoor air concentration due to vapor intrusion	(ug/m ³)	C _{ia}	4.8E-01	4.7E-01 - 4.8E-01	4.8E-01	4.7E-01 - 4.8E-01	
	(ppbv)		8.9E-02	8.7E-02 - 8.9E-02	8.9E-02	8.7E-02 - 8.9E-02	
Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag
Subslab vapor concentration	(ug/m ³) (ppbv)	C _{ss}	1.6E+02 3.0E+01	9.6E+00 - 4.7E+03 1.8E+00 - 8.7E+02	1.6E+02 3.0E+01	4.7E+03 - 4.8E+03 8.7E+02 - 8.9E+02	
Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag
Effective diffusion coefficient through Stratum A	(cm ² /sec)	DeffA	3.0E-03	-	3.0E-03	-	
Effective diffusion coefficient through Stratum B	(cm ² /sec)	DeffB	1.8E-03	-	1.8E-03	-	
Effective diffusion coefficient through Stratum C	(cm ² /sec)	DeffC	-	-	-	-	
Effective diffusion coefficient through capillary zone	(cm ² /sec)	DeffCZ	9.4E-06	-	9.4E-06	-	
Effective diffusion coefficient through unsaturated zone	(cm ² /sec)	DeffT	1.7E-04	-	1.7E-04	-	
Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.4E-06	-	2.4E-06		

Model Input**Site Name/Run Number:**

Example, Run 1

Note:

- Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
- Dotted outline cells indicate default values that may be changed with justification.
- Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

[Use English / Metric Converter](#)

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	500		NA			
Depth below grade to water table	(m)	Ls	5.50		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	25	25	3 - 25			
Calc: Source vapor concentration	(ug/m ³)	Cs	201407					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.041%					
Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m ³) ⁻¹	IUR	see note	see note	NA	NA		
Mutagenic compound		Mut	Yes		NA	NA		
Reference concentration	(mg/m ³)	RfC	2.00E-03	2.00E-03	NA	NA		
Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25°C	(atm·m ³ /mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	4.03E-01	4.03E-01				
Diffusivity in air	(cm ² /s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm ² /s)	Dwater	1.02E-05	1.02E-05	NA	NA		
Building Characteristics:								
Select Building Assumptions								
<input checked="" type="radio"/> Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)								
<input type="radio"/> Specify Qsoil and Qbuilding separately; calculate ratio								
	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment

Building setting	Bldg_Setting	Commercial	Commercial		
Foundation type	Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019
Enclosed space floor area	(m ²)	Abf	1500.00	1500.00	80-1000
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05
Indoor air exchange rate	(l / hr)	ach	1.50	1.50	.3-4.1
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05
Calc: Building ventilation rate	(m ³ /hr)	Qb	6750.00	6750.00	NA
Calc: Average vapor flow rate into building	(m ³ /hr)	Qsoil	20.25	20.25	NA

Model Input Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Depth below grade to water table: 5.50 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Silt					
Stratum A thickness (from surface)	(m)	hSA	5.50					
Stratum A total porosity	(-)	nSA	0.489	0.489	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.167	0.167	0.05 - 0.28	0.25		
Stratum A bulk density	(g/cm ³)	rhoSA	1.350	1.350	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Silt					
Stratum B thickness	(m)	hSB	0.00				WARNING	hsB < hcZ; hcZ may be overestimated.
Stratum B total porosity	(-)	nSB	0.489	0.489	NA	0.20		
Stratum B water-filled porosity	(-)	nwSB	0.167	0.167	0.05 - 0.28	0.25		
Stratum B bulk density	(g/cm ³)	rhoSB	1.350	1.350	NA	0.05		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm ³)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum B					

Height of capillary fringe	(m)	hcZ	1.630	1.630	NA	NA		
Capillary zone total porosity	(-)	ncZ	0.489	0.489	NA	0.20		
Capillary zone water filled porosity	(-)	nwcZ	0.382	0.382	NA	0.24		
Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calcu

Model Output	Site Name/Run Number:			Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.			
Chemical Name: Trichloroethylene	CAS No. 79-01-6						
Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag
Groundwater to indoor air attenuation coefficient	(-)	alpha	8.2E-06	7.6E-06 - 8.2E-06	8.2E-06	7.6E-06 - 8.2E-06	WARNING
Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag
Indoor air concentration due to vapor intrusion	(ug/m3)	Cia	1.7E+00	1.5E+00 - 1.7E+00	1.7E+00	1.5E+00 - 1.7E+00	
	(ppbv)		3.1E-01	2.9E-01 - 3.1E-01	3.1E-01	2.9E-01 - 3.1E-01	WARNING
Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag
Subslab vapor concentration	(ug/m3) (ppbv)	Css	5.5E+02 1.0E+02	3.3E+01 - 1.5E+04 6.2E+00 - 2.9E+03	5.5E+02 1.0E+02	1.5E+04 - 1.7E+04 2.9E+03 - 3.1E+03	
Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag
Effective diffusion coefficient through Stratum A	(cm ² /sec)	DeffA	6.6E-03	-	6.6E-03	-	
Effective diffusion coefficient through Stratum B	(cm ² /sec)	DeffB	6.6E-03	-	6.6E-03	-	
Effective diffusion coefficient through Stratum C	(cm ² /sec)	DeffC	-	-	-	-	
Effective diffusion coefficient through capillary zone	(cm ² /sec)	DeffCZ	1.7E-04	-	1.7E-04	-	
Effective diffusion coefficient through unsaturated zone	(cm ² /sec)	DeffT	5.3E-04	-	5.3E-04	-	
Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	8.2E-06	-	8.2E-06		

Model Input		Site Name/Run Number		Example, Run 1					
Note:									
<u>Source Characteristics</u>		Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium	Source	Groundwater							
Groundwater conc.	(ug/L)	Cmedium	500						
Depth below ground	(m)	Ls	0.50						
Average groundwater	(°C)	Ts	25	25	Vary - 50 3 - 25		NA		
Calc: Source concentration	(ug/m ³)	Cs	568438						
Calc: % of pure component	(%)	%Sat	0.006%						
<u>Chemical:</u>		Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name	Chem	Vinyl Chloride							
CAS No.	CAS	75-01-4							
<u>Toxicity Factors</u>									
Unit risk factor	(ug/m ³) ⁻¹	IUR	4.40E-06	4.40E-06	NA	NA	NA		
Mutagenic compound	Mut	VC	NA		NA	NA			
Reference concentration	(mg/m ³)	RfC	1.00E-01	1.00E-01	NA	NA	NA		
<u>Chemical Properties:</u>		Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component wa	(mg/L)	S	8.80E+03	8.80E+03	NA	NA	NA		
Henry's Law Constant	(atm-m ³ /mc)	Hc	2.78E-02	2.78E-02	NA	NA	NA		
Calc: Henry's Law Constant @ 25°C	dimensionless	Hr	1.14E+00	1.14E+00					
Calc: Henry's Law Constant @ system temperature	dimensionless	Hs	1.14E+00	1.14E+00					
Diffusivity in air	(cm ² /s)	Dair	1.07E-01	1.07E-01	NA	NA	NA		
Diffusivity in water	(cm ² /s)	Dwater	1.20E-05	1.20E-05	NA	NA	NA		
<u>Building Characteristics:</u>									
Select Building Assumptions									
<input checked="" type="radio"/> Use ratio for Qsoil/Qbuilding (recommended if no site specific data available) <input type="radio"/> Specify Qsoil and Qbuilding separately; calculate ratio									

Units	Symbol	Value	1	Potential Span	CV	Flag	Comment
Building setting	Bldg_Setting	Commercial	Commercial				
Foundation type	Found_Type	Slab-on-grade	Slab-on-grade				
Depth bel (m)	Lb	0.20	0.20	0.1 - 2.44	NA		
Foundatio (m)	Lf	0.20	0.20	0.1 - 0.25	NA		
Fraction o (-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed s (m2)	Abf	1500.00	1500.00	80-1000	NA		
Enclosed s (m)	Hb	3.00	3.00	2.13 - 3.05	NA		
Indoor air (1 / hr)	ach	1.50	1.50	.3-4.1	NA		
Qsoil/Qbu (-)	Qsoil_Qb	#VALUE!	#VALUE!	0.0001 - 0.05	1.24		
Calc: Build (m3/hr)	Qb	6750.00	6750.00	NA	0.30		
Calc: Average vapor flow rate into building (m3/hr)	Qsoil	20.25	20.25	NA	NA		

Source Characteristics:

Model Input Site Name/Run Number

Chemical Name: Vinyl Chloride CAS No. 75-01-4

Depth below grade to water table: 0.50 meters

Vadose zone character	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type	SCS_A	Silt						
Stratum A thickne (m)	hSA	0.50						
Stratum A (-)	nSA	0.489	0.489	NA	0.20			
Stratum A (-)	nwSA	0.167	0.167	0.05 - 0.28	0.25			
Stratum A (g/cm ³)	rhoSA	1.350	1.350	NA	0.05			
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type	SCS_B	Silt						
Stratum B thickne (m)	hSB	0.00					ERROR	hSB+hSA must be >= hc _z .
Stratum B (-)	nSB	0.489	0.489	NA	0.20			
Stratum B (-)	nwSB	0.167	0.167	0.05 - 0.28	0.25			
Stratum B (g/cm ³)	rhoSB	1.350	1.350	NA	0.05			
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type	SCS_C	Not Present						
Stratum C thickne (m)	hSC	0.00						
Stratum C (-)	nSC			NA	NA			
Stratum C (-)	nwSC			NA	NA			
Stratum C (g/cm ³)	rhoSC			NA	NA			
Stratum directly above the water table								
Stratum A, B, or C	src_soil	Stratum B					ERROR	

Height of c (m)	hc	1.630	1.630	NA	NA	
Capillary z (-)	nc	0.489	0.489	NA	0.20	
Capillary z (-)	nwc	0.382	0.382	NA	0.24	

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcin	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for c (yrs)	ATc		70	70	NA	NA		
Averaging time for n (yrs)	ATnc		25	25	NA	NA		
Exposure duration (yrs)	ED		25	25	NA	NA		
Exposure frequency (days/yr)	EF		250	250	NA	NA		
Exposure time [hrs/24 hrs]	ET		8	8	NA	NA		
Mutagenic mode-of- (yrs)	MMOAF		72	72	NA	NA		MMOAF used in place of ED in risk calculations

Source Characteristics:

Model Output	Site Name/Run Number	Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.						
Chemical Name: Vinyl Chloride CAS No. 75-01-4								
Source to Indoor Air Attenuation	Units	Symbol	Value	Range	Default	fault Ran	Flag	Comment
Groundwater to indoor air	(-)	alpha	1.4E-05	0.0E+00 - 0.0E+00	1.4E-05	0.0E+00 - 0.0E+00	ERROR	Invalid result. Please correct errors.
							WARNING	Please review warning messages
Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	fault Ran	Flag	Comment
Indoor air concentration d	(ug/m3)	Cia	7.7E+00	0.0E+00 - 0.0E+00	7.7E+00	0.0E+00 - 0.0E+00	ERROR	Invalid result. Please correct errors.
	(ppbv)		3.0E+00	0.0E+00 - 0.0E+00	3.0E+00	0.0E+00 - 0.0E+00	WARNING	Please review warning messages
Predicted Vapor Conc. Beneath	Units	Symbol	Value	Range	Default	fault Ran	Flag	Comment
Subslab vapor concentration	(ug/m3)	Css	2.6E+03	0.0E+00 - 0.0E+00	2.6E+03	0.0E+00 - 0.0E+00		
	(ppbv)		1.0E+03	0.0E+00 - 0.0E+00	1.0E+03	0.0E+00 - 0.0E+00		
Diffusive Transport Upward Through	Units	Symbol	Value	Range	Default	fault Ran	Flag	Comment
Effective diffusion coefficient thi	(cm ² /sec)	DeffA	#VALUE!	-	#VALUE!	-		
Effective diffusion coefficient thi	(cm ² /sec)	DeffB	1.0E-02	-	1.0E-02	-		
Effective diffusion coefficient thi	(cm ² /sec)	DeffC	-	-	-	-		
Effective diffusion coefficient thi	(cm ² /sec)	DeffCZ	2.7E-04	-	2.7E-04	-		
Effective diffusion coefficient thi	(cm ² /sec)	DeffT	5.0E-05	-	5.0E-05	-		
Critical Parameters		Symbol	Value	Range	Default	fault Ran	Flag	
α for diffusive transport from	(-)	A_Param	1.4E-05	-	1.4E-05			

Pe (Peclet Number) for transport through the	(-)	B_Param	7.1E+02	0.0E+00 - 0.0E+00	7.1E+02	E+00 - 0.0E+00
α for convective transport from	(-)	C_Param	0.0E+00	0.0E+00 - 0.0E+00	5.0E-02	E+00 - 0.0E+00
Interpretation		Concentration versus Depth Profile				
Diffusion is the dominant mechanism active.		<p>The graph displays Soil Gas Concentration (ug/m3) on the x-axis (ranging from 0.0E+00 to 1.2E+00) against Depth (meter) on the y-axis (ranging from 0.0 to 1.2). The data points, labeled 'Measured', show a slight upward trend from approximately 0.05 ug/m3 at 0.1m depth to about 0.1 ug/m3 at 1.0m depth. A legend indicates a red square for 'Measured' data.</p>				
#DIV/0!						
Critical Parameters						
#DIV/0!						
Non-Critical Parameters						
#DIV/0!						

Please check WARNING or ERROR flags

Source Characteristics:

0	Site Name/Run Number	500						
	Chemical Name:	Vinyl Chloride	CAS No. 75-01-4					
Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Score Scenario: Commercial								
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for nonc	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	(ug/m3) (ppbv)	Target_IA	2.10E-01 8.22E-02	-	2.10E-01 8.22E-02	-	Target indoor air concentration based on cancer risk (unit	
Target groundwater concentrati	(ug/L)	Target_GW	1.36E+01	0.0E+00 - 0.0E+00	1.36E+01	0.0E+00 - 0.0E+00		
Incremental Risk Estimates								
Incremental cancer risk from vc	(-)	Cancer_Risk	2.77E-06	0.0E+00 - 0.0E+00	2.77E-06	E+00 - 0.0E		
Hazard quotient from vapor intr	(-)	HQ	1.76E-02	0.0E+00 - 0.0E+00	1.76E-02	E+00 - 0.0E		

Model Input**Site Name/Run Number:**

Example, Run 1

Note:

- Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
- Dotted outline cells indicate default values that may be changed with justification.
- Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

[Use English / Metric Converter](#)

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	500		NA			
Depth below grade to water table	(m)	Ls	5.00		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	25	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	568438					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.006%					
Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Vinyl Chloride					
CAS No.		CAS	75-01-4					
Toxicity Factors								
Unit risk factor	(ug/m ³) ⁻¹	IUR	4.40E-06	4.40E-06	NA	NA		
Mutagenic compound		Mut	VC	NA	NA	NA		
Reference concentration	(mg/m ³)	RfC	1.00E-01	1.00E-01	NA	NA		
Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	8.80E+03	8.80E+03	NA	NA		
Henry's Law Constant @ 25°C	(atm·m ³ /mol)	Hc	2.78E-02	2.78E-02	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	1.14E+00	1.14E+00				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	1.14E+00	1.14E+00				
Diffusivity in air	(cm ² /s)	Dair	1.07E-01	1.07E-01	NA	NA		
Diffusivity in water	(cm ² /s)	Dwater	1.20E-05	1.20E-05	NA	NA		
Building Characteristics:								
Select Building Assumptions								
<input checked="" type="radio"/> Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)								
<input type="radio"/> Specify Qsoil and Qbuilding separately; calculate ratio								
	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment

Building setting	Bldg_Setting	Commercial	Commercial		
Foundation type	Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019
Enclosed space floor area	(m ²)	Abf	1500.00	1500.00	80-1000
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05
Indoor air exchange rate	(l / hr)	ach	1.50	1.50	.3-4.1
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05
Calc: Building ventilation rate	(m ³ /hr)	Qb	6750.00	6750.00	NA
Calc: Average vapor flow rate into building	(m ³ /hr)	Qsoil	20.25	20.25	NA

Model Input Site Name/Run Number: Example, Run 1

Chemical Name: Vinyl Chloride CAS No. 75-01-4

Depth below grade to water table: 5.00 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Silt					
Stratum A thickness (from surface)	(m)	hSA	2.50					
Stratum A total porosity	(-)	nSA	0.489	0.489	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.167	0.167	0.05 - 0.28	0.25		
Stratum A bulk density	(g/cm ³)	rhoSA	1.350	1.350	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Clay					
Stratum B thickness	(m)	hSB	2.50					
Stratum B total porosity	(-)	nSB	0.459	0.459	NA	0.20		
Stratum B water-filled porosity	(-)	nwSB	0.215	0.215	0.098 - 0.33	0.25		
Stratum B bulk density	(g/cm ³)	rhoSB	1.430	1.430	NA	0.05		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm ³)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum B					

Height of capillary fringe	(m)	hc _z	0.815	0.815	NA	NA		
Capillary zone total porosity	(-)	nc _z	0.459	0.459	NA	0.20		
Capillary zone water filled porosity	(-)	nwc _z	0.412	0.412	NA	0.24		
Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	AT _c	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	AT _{nc}	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calcu

Model Output	Site Name/Run Number:			Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.				
Chemical Name: Vinyl Chloride CAS No. 75-01-4	Example, Run 1							
Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	
Groundwater to indoor air attenuation coefficient	(-)	alpha	2.2E-06	2.1E-06 - 2.2E-06	2.2E-06	2.1E-06 - 2.2E-06		
Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	
Indoor air concentration due to vapor intrusion	(ug/m ³)	C _{ia}	1.2E+00	1.2E+00 - 1.2E+00	1.2E+00	1.2E+00 - 1.2E+00		
	(ppbv)		4.8E-01	4.7E-01 - 4.8E-01	4.8E-01	4.7E-01 - 4.8E-01		
Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	
Subslab vapor concentration	(ug/m ³) (ppbv)	C _{ss}	4.1E+02 1.6E+02	2.5E+01 - 1.2E+04 9.7E+00 - 4.7E+03	4.1E+02 1.6E+02	1.2E+04 - 1.2E+04 4.7E+03 - 4.8E+03		
Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	
Effective diffusion coefficient through Stratum A	(cm ² /sec)	DeffA	1.0E-02	-	1.0E-02	-		
Effective diffusion coefficient through Stratum B	(cm ² /sec)	DeffB	4.6E-03	-	4.6E-03	-		
Effective diffusion coefficient through Stratum C	(cm ² /sec)	DeffC	-	-	-	-		
Effective diffusion coefficient through capillary zone	(cm ² /sec)	DeffCZ	2.2E-05	-	2.2E-05	-		
Effective diffusion coefficient through unsaturated zone	(cm ² /sec)	DeffT	1.3E-04	-	1.3E-04	-		
Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag	
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.2E-06	-	2.2E-06			

Model Input**Site Name/Run Number:**

Example, Run 1

Note:

- Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
- Dotted outline cells indicate default values that may be changed with justification.
- Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

[Use English / Metric Converter](#)

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	500		NA			
Depth below grade to water table	(m)	Ls	6.00		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	25	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	568438					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.006%					
Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Vinyl Chloride					
CAS No.		CAS	75-01-4					
Toxicity Factors								
Unit risk factor	(ug/m ³) ⁻¹	IUR	4.40E-06	4.40E-06	NA	NA		
Mutagenic compound		Mut	VC	NA	NA	NA		
Reference concentration	(mg/m ³)	RfC	1.00E-01	1.00E-01	NA	NA		
Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	8.80E+03	8.80E+03	NA	NA		
Henry's Law Constant @ 25°C	(atm·m ³ /mol)	Hc	2.78E-02	2.78E-02	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	1.14E+00	1.14E+00				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	1.14E+00	1.14E+00				
Diffusivity in air	(cm ² /s)	Dair	1.07E-01	1.07E-01	NA	NA		
Diffusivity in water	(cm ² /s)	Dwater	1.20E-05	1.20E-05	NA	NA		
Building Characteristics:								
Select Building Assumptions								
<input checked="" type="radio"/> Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)								
<input type="radio"/> Specify Qsoil and Qbuilding separately; calculate ratio								
	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment

Building setting	Bldg_Setting	Commercial	Commercial		
Foundation type	Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019
Enclosed space floor area	(m ²)	Abf	1500.00	1500.00	80-1000
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05
Indoor air exchange rate	(l / hr)	ach	1.50	1.50	.3-4.1
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05
Calc: Building ventilation rate	(m ³ /hr)	Qb	6750.00	6750.00	NA
Calc: Average vapor flow rate into building	(m ³ /hr)	Qsoil	20.25	20.25	NA

Model Input Site Name/Run Number: Example, Run 1

Chemical Name: Vinyl Chloride CAS No. 75-01-4

Depth below grade to water table: 6.00 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Clay					
Stratum A thickness (from surface)	(m)	hSA	3.00					
Stratum A total porosity	(-)	nSA	0.459	0.459	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.215	0.215	0.098 - 0.33	0.25		
Stratum A bulk density	(g/cm ³)	rhoSA	1.430	1.430	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Sandy Clay					
Stratum B thickness	(m)	hSB	3.00					
Stratum B total porosity	(-)	nSB	0.385	0.385	NA	0.20		
Stratum B water-filled porosity	(-)	nwSB	0.197	0.197	0.117 - 0.28	0.25		
Stratum B bulk density	(g/cm ³)	rhoSB	1.630	1.630	NA	0.05		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm ³)	rhoSC			NA	NA		
Stratum directly above the water table		src_soil	Stratum B					
Stratum A, B, or C								

Height of capillary fringe	(m)	hc _z	0.300	0.300	NA	NA		
Capillary zone total porosity	(-)	nc _z	0.385	0.385	NA	0.20		
Capillary zone water filled porosity	(-)	nwc _z	0.355	0.355	NA	0.13		
Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	AT _c	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	AT _{nc}	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calcu

Model Output	Site Name/Run Number:		Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.					
Chemical Name: Vinyl Chloride CAS No. 75-01-4								
Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	
Groundwater to indoor air attenuation coefficient	(-)	alpha	2.2E-06	2.2E-06 - 2.2E-06	2.2E-06	2.2E-06 - 2.2E-06		
Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	
Indoor air concentration due to vapor intrusion	(ug/m ³)	C _{ia}	1.3E+00	1.2E+00 - 1.3E+00	1.3E+00	1.2E+00 - 1.3E+00		
	(ppbv)		4.9E-01	4.8E-01 - 4.9E-01	4.9E-01	4.8E-01 - 4.9E-01		
Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	
Subslab vapor concentration	(ug/m ³) (ppbv)	C _{ss}	4.2E+02 1.6E+02	2.5E+01 - 1.2E+04 9.9E+00 - 4.8E+03	4.2E+02 1.6E+02	1.2E+04 - 1.3E+04 4.8E+03 - 4.9E+03		
Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	
Effective diffusion coefficient through Stratum A	(cm ² /sec)	DeffA	4.6E-03	-	4.6E-03	-		
Effective diffusion coefficient through Stratum B	(cm ² /sec)	DeffB	2.8E-03	-	2.8E-03	-		
Effective diffusion coefficient through Stratum C	(cm ² /sec)	DeffC	-	-	-	-		
Effective diffusion coefficient through capillary zone	(cm ² /sec)	DeffCZ	8.5E-06	-	8.5E-06	-		
Effective diffusion coefficient through unsaturated zone	(cm ² /sec)	DeffT	1.6E-04	-	1.6E-04	-		
Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag	
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.2E-06	-	2.2E-06			

Model Input**Site Name/Run Number:**

Example, Run 1

Note:

- Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
- Dotted outline cells indicate default values that may be changed with justification.
- Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

[Use English / Metric Converter](#)

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	500		NA			
Depth below grade to water table	(m)	Ls	6.50		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	25	25	3 - 25			
Calc: Source vapor concentration	(ug/m ³)	Cs	568438					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.006%					
Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Vinyl Chloride					
CAS No.		CAS	75-01-4					
Toxicity Factors								
Unit risk factor	(ug/m ³) ⁻¹	IUR	4.40E-06	4.40E-06	NA	NA		
Mutagenic compound		Mut	VC	NA	NA	NA		
Reference concentration	(mg/m ³)	RfC	1.00E-01	1.00E-01	NA	NA		
Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	8.80E+03	8.80E+03	NA	NA		
Henry's Law Constant @ 25°C	(atm·m ³ /mol)	Hc	2.78E-02	2.78E-02	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	1.14E+00	1.14E+00				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	1.14E+00	1.14E+00				
Diffusivity in air	(cm ² /s)	Dair	1.07E-01	1.07E-01	NA	NA		
Diffusivity in water	(cm ² /s)	Dwater	1.20E-05	1.20E-05	NA	NA		
Building Characteristics:								
Select Building Assumptions								
<input checked="" type="radio"/> Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)								
<input type="radio"/> Specify Qsoil and Qbuilding separately; calculate ratio								
	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment

Building setting	Bldg_Setting	Commercial	Commercial		
Foundation type	Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019
Enclosed space floor area	(m ²)	Abf	1500.00	1500.00	80-1000
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05
Indoor air exchange rate	(l / hr)	ach	1.50	1.50	.3-4.1
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05
Calc: Building ventilation rate	(m ³ /hr)	Qb	6750.00	6750.00	NA
Calc: Average vapor flow rate into building	(m ³ /hr)	Qsoil	20.25	20.25	NA

Model Input Site Name/Run Number: Example, Run 1

Chemical Name: Vinyl Chloride CAS No. 75-01-4

Depth below grade to water table: 6.50 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Silt					
Stratum A thickness (from surface)	(m)	hSA	6.50					
Stratum A total porosity	(-)	nSA	0.489	0.489	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.167	0.167	0.05 - 0.28	0.25		
Stratum A bulk density	(g/cm ³)	rhoSA	1.350	1.350	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Silt					
Stratum B thickness	(m)	hSB	0.00				WARNING	hSB < hc _Z ; hc _Z may be overestimated.
Stratum B total porosity	(-)	nSB	0.489	0.489	NA	0.20		
Stratum B water-filled porosity	(-)	nwSB	0.167	0.167	0.05 - 0.28	0.25		
Stratum B bulk density	(g/cm ³)	rhoSB	1.350	1.350	NA	0.05		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm ³)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum B					

Height of capillary fringe	(m)	hc _z	1.630	1.630	NA	NA		
Capillary zone total porosity	(-)	nc _z	0.489	0.489	NA	0.20		
Capillary zone water filled porosity	(-)	nwc _z	0.382	0.382	NA	0.24		
Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	AT _c	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	AT _{nc}	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calcu

Model Output	Site Name/Run Number:				Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.		
Chemical Name: Vinyl Chloride CAS No. 75-01-4	Example, Run 1						
Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag
Groundwater to indoor air attenuation coefficient	(-)	alpha	1.2E-05	1.1E-05 - 1.2E-05	1.2E-05	1.1E-05 - 1.2E-05	WARNING
Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag
Indoor air concentration due to vapor intrusion	(ug/m ³)	C _{ia}	7.0E+00	6.3E+00 - 7.1E+00	7.0E+00	6.3E+00 - 7.1E+00	
	(ppbv)		2.8E+00	2.5E+00 - 2.8E+00	2.8E+00	2.5E+00 - 2.8E+00	WARNING
Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag
Subslab vapor concentration	(ug/m ³) (ppbv)	C _{ss}	2.3E+03 9.2E+02	1.4E+02 - 6.3E+04 5.5E+01 - 2.5E+04	2.3E+03 9.2E+02	6.3E+04 - 7.1E+04 2.5E+04 - 2.8E+04	
Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag
Effective diffusion coefficient through Stratum A	(cm ² /sec)	DeffA	1.0E-02	-	1.0E-02	-	
Effective diffusion coefficient through Stratum B	(cm ² /sec)	DeffB	1.0E-02	-	1.0E-02	-	
Effective diffusion coefficient through Stratum C	(cm ² /sec)	DeffC	-	-	-	-	
Effective diffusion coefficient through capillary zone	(cm ² /sec)	DeffCZ	2.7E-04	-	2.7E-04	-	
Effective diffusion coefficient through unsaturated zone	(cm ² /sec)	DeffT	9.6E-04	-	9.6E-04	-	
Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	1.2E-05	-	1.2E-05		

Model Input**Site Name/Run Number:**

Example, Run 1

Note:

- Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
- Dotted outline cells indicate default values that may be changed with justification.
- Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

[Use English / Metric Converter](#)

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	500		NA			
Depth below grade to water table	(m)	Ls	5.00		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	25	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	568438					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.006%					
Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Vinyl Chloride					
CAS No.		CAS	75-01-4					
Toxicity Factors								
Unit risk factor	(ug/m ³) ⁻¹	IUR	4.40E-06	4.40E-06	NA	NA		
Mutagenic compound		Mut	VC	NA	NA	NA		
Reference concentration	(mg/m ³)	RfC	1.00E-01	1.00E-01	NA	NA		
Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	8.80E+03	8.80E+03	NA	NA		
Henry's Law Constant @ 25°C	(atm·m ³ /mol)	Hc	2.78E-02	2.78E-02	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	1.14E+00	1.14E+00				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	1.14E+00	1.14E+00				
Diffusivity in air	(cm ² /s)	Dair	1.07E-01	1.07E-01	NA	NA		
Diffusivity in water	(cm ² /s)	Dwater	1.20E-05	1.20E-05	NA	NA		
Building Characteristics:								
Select Building Assumptions								
<input checked="" type="radio"/> Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)								
<input type="radio"/> Specify Qsoil and Qbuilding separately; calculate ratio								
	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment

Building setting	Bldg_Setting	Commercial	Commercial		
Foundation type	Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019
Enclosed space floor area	(m ²)	Abf	1500.00	1500.00	80-1000
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05
Indoor air exchange rate	(l / hr)	ach	1.50	1.50	.3-4.1
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05
Calc: Building ventilation rate	(m ³ /hr)	Qb	6750.00	6750.00	NA
Calc: Average vapor flow rate into building	(m ³ /hr)	Qsoil	20.25	20.25	NA

Model Input Site Name/Run Number: Example, Run 1

Chemical Name: Vinyl Chloride CAS No. 75-01-4

Depth below grade to water table: 5.00 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Silt					
Stratum A thickness (from surface)	(m)	hSA	5.00					
Stratum A total porosity	(-)	nSA	0.489	0.489	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.167	0.167	0.05 - 0.28	0.25		
Stratum A bulk density	(g/cm ³)	rhoSA	1.350	1.350	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Silt					
Stratum B thickness	(m)	hSB	0.00				WARNING	hsB < hcZ; hcZ may be overestimated.
Stratum B total porosity	(-)	nSB	0.489	0.489	NA	0.20		
Stratum B water-filled porosity	(-)	nwSB	0.167	0.167	0.05 - 0.28	0.25		
Stratum B bulk density	(g/cm ³)	rhoSB	1.350	1.350	NA	0.05		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm ³)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum B					

Height of capillary fringe	(m)	hc _z	1.630	1.630	NA	NA		
Capillary zone total porosity	(-)	nc _z	0.489	0.489	NA	0.20		
Capillary zone water filled porosity	(-)	nwc _z	0.382	0.382	NA	0.24		
Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	AT _c	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	AT _{nc}	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calcu

Model Output	Site Name/Run Number:				Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.		
Chemical Name: Vinyl Chloride CAS No. 75-01-4				Example, Run 1			
Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag
Groundwater to indoor air attenuation coefficient	(-)	alpha	1.3E-05	1.1E-05 - 1.3E-05	1.3E-05	1.1E-05 - 1.3E-05	WARNING
Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag
Indoor air concentration due to vapor intrusion				7.2E+00	6.4E+00 - 7.2E+00	7.2E+00	6.4E+00 - 7.2E+00
				2.8E+00	2.5E+00 - 2.8E+00	2.8E+00	2.5E+00 - 2.8E+00
Predicted Vapor Conc. Beneath Foundation				2.4E+03	1.4E+02 - 6.4E+04	2.4E+03	6.4E+04 - 7.2E+04
				9.4E+02	5.7E+01 - 2.5E+04	9.4E+02	2.5E+04 - 2.8E+04
Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag
Effective diffusion coefficient through Stratum A	(cm ² /sec)	DeffA	1.0E-02	-	1.0E-02	-	
Effective diffusion coefficient through Stratum B	(cm ² /sec)	DeffB	1.0E-02	-	1.0E-02	-	
Effective diffusion coefficient through Stratum C	(cm ² /sec)	DeffC	-	-	-	-	
Effective diffusion coefficient through capillary zone	(cm ² /sec)	DeffCZ	2.7E-04	-	2.7E-04	-	
Effective diffusion coefficient through unsaturated zone	(cm ² /sec)	DeffT	7.5E-04	-	7.5E-04	-	
Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	1.3E-05	-	1.3E-05		

Model Input**Site Name/Run Number:**

Example, Run 1

Note:

- Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
- Dotted outline cells indicate default values that may be changed with justification.
- Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

[Use English / Metric Converter](#)

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	500		NA			
Depth below grade to water table	(m)	Ls	3.00		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	25	25	3 - 25			
Calc: Source vapor concentration	(ug/m ³)	Cs	568438					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.006%					
Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Vinyl Chloride					
CAS No.		CAS	75-01-4					
Toxicity Factors								
Unit risk factor	(ug/m ³) ⁻¹	IUR	4.40E-06	4.40E-06	NA	NA		
Mutagenic compound		Mut	VC	NA	NA	NA		
Reference concentration	(mg/m ³)	RfC	1.00E-01	1.00E-01	NA	NA		
Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	8.80E+03	8.80E+03	NA	NA		
Henry's Law Constant @ 25°C	(atm·m ³ /mol)	Hc	2.78E-02	2.78E-02	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	1.14E+00	1.14E+00				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	1.14E+00	1.14E+00				
Diffusivity in air	(cm ² /s)	Dair	1.07E-01	1.07E-01	NA	NA		
Diffusivity in water	(cm ² /s)	Dwater	1.20E-05	1.20E-05	NA	NA		
Building Characteristics:								
Select Building Assumptions								
<input checked="" type="radio"/> Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)								
<input type="radio"/> Specify Qsoil and Qbuilding separately; calculate ratio								
	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment

Building setting	Bldg_Setting	Commercial	Commercial		
Foundation type	Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019
Enclosed space floor area	(m ²)	Abf	1500.00	1500.00	80-1000
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05
Indoor air exchange rate	(l / hr)	ach	1.50	1.50	.3-4.1
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05
Calc: Building ventilation rate	(m ³ /hr)	Qb	6750.00	6750.00	NA
Calc: Average vapor flow rate into building	(m ³ /hr)	Qsoil	20.25	20.25	NA

Model Input Site Name/Run Number: Example, Run 1

Chemical Name: Vinyl Chloride CAS No. 75-01-4

Depth below grade to water table: 3.00 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Clay					
Stratum A thickness (from surface)	(m)	hSA	1.50					
Stratum A total porosity	(-)	nSA	0.459	0.459	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.215	0.215	0.098 - 0.33	0.25		
Stratum A bulk density	(g/cm ³)	rhoSA	1.430	1.430	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Sandy Clay					
Stratum B thickness	(m)	hSB	1.50					
Stratum B total porosity	(-)	nSB	0.385	0.385	NA	0.20		
Stratum B water-filled porosity	(-)	nwSB	0.197	0.197	0.117 - 0.28	0.25		
Stratum B bulk density	(g/cm ³)	rhoSB	1.630	1.630	NA	0.05		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm ³)	rhoSC			NA	NA		
Stratum directly above the water table		src_soil	Stratum B					
Stratum A, B, or C								

Height of capillary fringe	(m)	hc _z	0.300	0.300	NA	NA		
Capillary zone total porosity	(-)	nc _z	0.385	0.385	NA	0.20		
Capillary zone water filled porosity	(-)	nwc _z	0.355	0.355	NA	0.13		
Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	AT _c	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	AT _{nc}	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calcu

Model Output	Site Name/Run Number:			Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.				
Chemical Name: Vinyl Chloride CAS No. 75-01-4	Example, Run 1							
Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	
Groundwater to indoor air attenuation coefficient	(-)	alpha	2.3E-06	2.2E-06 - 2.3E-06	2.3E-06	2.2E-06 - 2.3E-06		
Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	
Indoor air concentration due to vapor intrusion	(ug/m ³)	C _{ia}	1.3E+00	1.3E+00 - 1.3E+00	1.3E+00	1.3E+00 - 1.3E+00		
	(ppbv)		5.0E-01	4.9E-01 - 5.0E-01	5.0E-01	4.9E-01 - 5.0E-01		
Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	
Subslab vapor concentration	(ug/m ³) (ppbv)	C _{ss}	4.3E+02 1.7E+02	2.6E+01 - 1.3E+04 1.0E+01 - 4.9E+03	4.3E+02 1.7E+02	1.3E+04 - 1.3E+04 4.9E+03 - 5.0E+03		
Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	
Effective diffusion coefficient through Stratum A	(cm ² /sec)	DeffA	4.6E-03	-	4.6E-03	-		
Effective diffusion coefficient through Stratum B	(cm ² /sec)	DeffB	2.8E-03	-	2.8E-03	-		
Effective diffusion coefficient through Stratum C	(cm ² /sec)	DeffC	-	-	-	-		
Effective diffusion coefficient through capillary zone	(cm ² /sec)	DeffCZ	8.5E-06	-	8.5E-06	-		
Effective diffusion coefficient through unsaturated zone	(cm ² /sec)	DeffT	7.8E-05	-	7.8E-05	-		
Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag	
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.3E-06	-	2.3E-06			

Model Input**Site Name/Run Number:**

Example, Run 1

Note:

- Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
- Dotted outline cells indicate default values that may be changed with justification.
- Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

[Use English / Metric Converter](#)

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	500		NA			
Depth below grade to water table	(m)	Ls	5.50		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	25	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	568438					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.006%					
Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Vinyl Chloride					
CAS No.		CAS	75-01-4					
Toxicity Factors								
Unit risk factor	(ug/m ³) ⁻¹	IUR	4.40E-06	4.40E-06	NA	NA		
Mutagenic compound		Mut	VC	NA	NA	NA		
Reference concentration	(mg/m ³)	RfC	1.00E-01	1.00E-01	NA	NA		
Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	8.80E+03	8.80E+03	NA	NA		
Henry's Law Constant @ 25°C	(atm·m ³ /mol)	Hc	2.78E-02	2.78E-02	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	1.14E+00	1.14E+00				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	1.14E+00	1.14E+00				
Diffusivity in air	(cm ² /s)	Dair	1.07E-01	1.07E-01	NA	NA		
Diffusivity in water	(cm ² /s)	Dwater	1.20E-05	1.20E-05	NA	NA		
Building Characteristics:								
Select Building Assumptions								
<input checked="" type="radio"/> Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)								
<input type="radio"/> Specify Qsoil and Qbuilding separately; calculate ratio								
	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment

Building setting	Bldg_Setting	Commercial	Commercial		
Foundation type	Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019
Enclosed space floor area	(m ²)	Abf	1500.00	1500.00	80-1000
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05
Indoor air exchange rate	(l / hr)	ach	1.50	1.50	.3-4.1
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05
Calc: Building ventilation rate	(m ³ /hr)	Qb	6750.00	6750.00	NA
Calc: Average vapor flow rate into building	(m ³ /hr)	Qsoil	20.25	20.25	NA

Model Input Site Name/Run Number: Example, Run 1

Chemical Name: Vinyl Chloride CAS No. 75-01-4

Depth below grade to water table: 5.50 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Silt					
Stratum A thickness (from surface)	(m)	hSA	5.50					
Stratum A total porosity	(-)	nSA	0.489	0.489	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.167	0.167	0.05 - 0.28	0.25		
Stratum A bulk density	(g/cm ³)	rhoSA	1.350	1.350	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Silt					
Stratum B thickness	(m)	hSB	0.00				WARNING	hsB < hcZ; hcZ may be overestimated.
Stratum B total porosity	(-)	nSB	0.489	0.489	NA	0.20		
Stratum B water-filled porosity	(-)	nwSB	0.167	0.167	0.05 - 0.28	0.25		
Stratum B bulk density	(g/cm ³)	rhoSB	1.350	1.350	NA	0.05		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm ³)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum B					

Height of capillary fringe	(m)	hc _z	1.630	1.630	NA	NA		
Capillary zone total porosity	(-)	nc _z	0.489	0.489	NA	0.20		
Capillary zone water filled porosity	(-)	nwc _z	0.382	0.382	NA	0.24		
Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	AT _c	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	AT _{nc}	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calcu

Model Output	Site Name/Run Number:				Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.		
Chemical Name: Vinyl Chloride CAS No. 75-01-4				Example, Run 1			
Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag
Groundwater to indoor air attenuation coefficient	(-)	alpha	1.3E-05	1.1E-05 - 1.3E-05	1.3E-05	1.1E-05 - 1.3E-05	WARNING
Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag
Indoor air concentration due to vapor intrusion	(ug/m ³)	C _{ia}	7.1E+00	6.4E+00 - 7.2E+00	7.1E+00	6.4E+00 - 7.2E+00	
	(ppbv)		2.8E+00	2.5E+00 - 2.8E+00	2.8E+00	2.5E+00 - 2.8E+00	WARNING
Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag
Subslab vapor concentration	(ug/m ³) (ppbv)	C _{ss}	2.4E+03 9.3E+02	1.4E+02 - 6.4E+04 5.6E+01 - 2.5E+04	2.4E+03 9.3E+02	6.4E+04 - 7.2E+04 2.5E+04 - 2.8E+04	
Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag
Effective diffusion coefficient through Stratum A	(cm ² /sec)	DeffA	1.0E-02	-	1.0E-02	-	
Effective diffusion coefficient through Stratum B	(cm ² /sec)	DeffB	1.0E-02	-	1.0E-02	-	
Effective diffusion coefficient through Stratum C	(cm ² /sec)	DeffC	-	-	-	-	
Effective diffusion coefficient through capillary zone	(cm ² /sec)	DeffCZ	2.7E-04	-	2.7E-04	-	
Effective diffusion coefficient through unsaturated zone	(cm ² /sec)	DeffT	8.2E-04	-	8.2E-04	-	
Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	1.3E-05	-	1.3E-05		